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Two Theses Abstracts

Avalloy McCarthy - Curvin

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Bios

1. **Fareena Alladin** is a PhD candidate and instructor in Sociology at the University of the West Indies, St. Augustine (UWI-STA), where she teaches courses in introductory statistics, survey research and health sociology. As a researcher, her interests focus on sociological issues affecting eating behaviour, research methods and statistics education.
2. **Desirée Antonio** holds a doctorate in Education from the University of Liverpool, UK. She currently works as an Education Officer, School Administration with the Ministry of Education, Sports and Creative Industries Antigua and Barbuda. Her work involves the supervision of teachers and principals, organising and delivering professional development sessions, staffing schools and making contributions to policy development. She has a keen interest in Continuing Professional Development since she believes it is a critical tool that can be used to assist in responding to the ever-changing environment in which we work as educators. As an adjunct lecturer, University of the West Indies, Five Islands Campus, she teaches student teachers in a Bachelor of Education Programme.
3. **Srikar Baireddy** is a premedical student who has been working in mixed methods research since 2016. His specific research interests are communication in a healthcare environment, issues in doctor-patient communication, and exploration of how this communication can be taught and improved. His previous credits include a secondary author on a research paper examining new methods of teaching empathetic communication to medical students using virtual patients. He has completed his BS at the University of Michigan and will complete an MS at the University of Pittsburgh in Summer 2021.
4. **Corinne Barnes** teaches courses in Media Ethics and Legal Issues, Media Research and Production and News and Feature Writing at the University of the West Indies, Mona. Her research interests include Health Communication, Media and Religion, Media Violence and Citizen Journalism.
5. **Olivia S.C. Bravo** is a lecturer in the Caribbean School of Media and Communication at the University of the West Indies, Mona Campus.

Her research and teaching interests focus on strategic communication, consumer behaviour and intercultural communication. Her research has appeared in the *Journal of Marketing Communications* and *Advances in Consumer Research*.

6. **Zhané Bridgeman-Maxwell** is currently a PhD candidate in Chemistry at the University of the West Indies, Cave Hill, Barbados. Her current area of research is in Physical Chemistry Education with a special interest in visualisation of abstract concepts through the creation and use of innovative technological tools, models and resources. Zhané is the founding vice president of the Chemistry Society of Cave Hill and has held subsequent posts of President and Postgraduate Representative. She is the Chemistry Postgraduate Representative for the Faculty of Science and Technology, the Graduate Student Representative on the Biological and Chemical Sciences Student Experience Committee at Cave Hill, and the International Younger Chemists Network Delegate from Cave Hill, for the International Union of Pure and Applied Chemistry.
7. **Peggy Shannon-Baker** is an assistant professor in the Department of Curriculum, Foundations and Reading at Georgia Southern University. Dr Shannon-Baker's work bridges two areas: critical, international approaches to teacher education and the use of social justice-informed research methods. In mixed methods research, this work focuses on visual and arts-based approaches in mixed methods studies and culturally relevant and sustainable research practices. This work and others have been published in the *Journal of Mixed Methods Research*, *International Journal of Qualitative Methods*, *International Journal of Multicultural Education*, *American Behavioral Scientist*, and elsewhere. They also have co-authored chapters forthcoming in *The Routledge handbook for advancing integration in mixed methods research* and *International encyclopedia of education* and published in *Mixed methods social network analysis: Theories and methodologies in learning and education*. Dr Shannon-Baker has received, consulted on and evaluated grant-funded projects in education and nursing.
8. **P. Paul Chandanabhumma** is a research fellow with the Michigan Mixed Methods Program. He completed his PhD in Community Health Sciences at UCLA Fielding School of Public Health. His research interests lie at the intersection of health inequities, race, culture, community engagement and the social production of medical

and public health practices. His mixed methods dissertation research examined the influence of group diversity on the achievements of community-based participatory research partnerships. He is supporting mixed methods research projects through the Department of Family Medicine.

9. **Loraine D. Cook** is a senior lecturer in the School of Education, The University of the West Indies (UWI), Mona, Jamaica. She lectures in Research Methods and Educational Psychology at the School of Education, University of the West Indies, Mona. Her research interests include evaluating online education in higher education and assisting teachers in improving their teaching skills by investigating ways of aligning the relationships between teachers' intended actions and their actual teaching behaviours. She has authored and co-authored peer-reviewed book chapters and journal articles. She is also the recipient of the Dean's Award for Excellence (2007) and the Most Outstanding PhD thesis award for the 2006/2007 academic year. Dr Cook was the recipient of the Fulbright Visiting Researcher Award (2011). Dr. Cook has been a visiting scholar in Applied Psychology at New York University (NYU) and the Faculty of Education, Language and Literacy Education, University of British Columbia, Canada.
10. **Jasmin Lawrence** is a lecturer in the English Language Section of the Department of Language, Linguistics and Philosophy at the University of the West Indies. She is coordinator for the academic literacies course offered to students in the faculties of Science and Technology, Engineering and Medical Sciences. She has worked in the airline, banking and telecommunications industries but has been a career educator for over 25 years. Her research interests include Academic Writing, Constructivist Methodology, Transformative Teaching and Learning, Student Development, Teaching English as a Second Language (TESL) and Design Thinking in Education. She was selected as a UWI Distinguished Awardee for teaching quality in 2018.
11. **John W. Creswell** is the founder and world-renowned scholar in mixed methods. His 27 books (including new editions) in research methods are used around the world and translated into a dozen languages. He held an endowed professor chair at Nebraska, served as the director of the first Mixed Methods Center in the world, co-founded the Journal of Mixed Methods Research (link is external) (SAGE), and he has been a Senior Fulbright Scholar to South Africa (2008) and to Thailand (2012). In 2011, he led a national

working group at the National Institutes of Health developing “best practices” for mixed methods research in the health sciences. In spring 2013, Dr. Creswell was a visiting professor at Harvard’s School of Public Health and in 2014, he was awarded an honorary doctorate from the University of Pretoria in South Africa. In 2014-2015, he served as the president of the Mixed Methods International Research Association (link is external) (MMIRA). Together with Michael D. Fetters, M.D., M.P.H., M.A., he leads the Michigan Mixed Methods Research and Scholarship Program (link is external), which runs workshops and offers consulting services on mixed methods research.

12. **Avalloy McCarthy-Curvin** lectures in the School of Education in the field of Mathematics Education. She holds a PhD in Mathematics Education and has over 15 years of teaching experience. Dr. McCarthy-Curvin currently chairs the M.Sc. Mathematics Board at the University of Technology, Jamaica and is a founder and chief executive officer of an intervention programme for children who struggle with primary-level mathematics. Additionally, she is one of the coordinators of the University of the West Indies’ annual Problem-Solving Competition and a founding member of the Mixed Methods Caribbean chapter.
13. **Melissa DeJonckheere** is an adolescent health researcher specialising in qualitative, participatory and mixed methods research. Her research focuses on psychosocial influences on health and well-being, particularly among adolescents with type 1 or type 2 diabetes. Dr. DeJonckheere is also interested in improving access to and participation in academic research for youth, students and trainees who have historically been excluded from science and research experiences. She is on the Executive Committee of the Michigan Mixed Methods Program (link to mixedmethods.org). She completed a post-doctoral research fellowship in the Michigan Mixed Methods Program. DeJonckheere completed her PhD in Educational Studies at the University of Cincinnati, where she worked on qualitative and mixed methods projects in both the education and health fields. She serves on the IHPI committee: Workforce Diversity in Healthcare (link is external) Recruitment and Retention Workgroup.
14. **Talia Esnard** is a sociologist and coordinator for the introductory statistics programme within the Department of Behavioural Sciences, University of the West Indies (UWI), St. Augustine campus. Her research interests centre on the sociology of work. Some of her

work has been published in the (i) NASPA Journal about Women in Higher Education, (ii) Women, Gender and Families of Color, (iii) Journal of Motherhood Initiative as well as (iv) Mentoring and Tutoring: Learning in Partnership Journal. She has also (co)authored/edited recent books on the tenure process, diversity, mentoring and entrepreneurship.

15. **Michael D. Feters** is a professor of family medicine at the University of Michigan (U-M) where he directs the Japanese Family Health Education and Research Programs that strives to provide culturally and linguistically competent care for the Japanese population currently residing in Ann Arbor and the Detroit Metropolitan area. Fluent in Japanese, he has also been instrumental in the introduction, preparation for, and teaching of, the concepts, skills and mission behind the specialty of family medicine for medical residents in Japan with a grant awarded to the U-M and the Department of Family Medicine titled the Shizuoka-University of Michigan Advanced Residency Training, Education and Research in Family Medicine (SMARTER FM). An international expert in the methodology of Mixed Methods Research, Professor Feters has taught multiple mixed methods workshops domestically and internationally in Canada, Denmark, China, Hong Kong, Qatar, South Africa and Japan. He helped coordinate the first Mixed Methods Conference in Japan in 2013 by serving on the organising committee and presenting. With Family Medicine Adjunct Professor John W. Creswell (link is external), he co-founded and directs the [<http://www.mixedmethods.org%20>]University of Michigan Mixed Methods Program (link is external). He serves as co-editor in chief with Jose Franciso Molina Azorin for the *Journal of Mixed Methods Research*(link is external).
16. **Glenda Gay** is a lecturer in the Department of Management Studies at The University of the West Indies, Cave Hill. She holds a PhD in Information Systems from Nova Southeastern University and has published several peer-reviewed journal articles and book chapters on managing large online classes, and readiness for online teaching and learning. She is also the recipient of the Principal's Award for Excellence in Teaching.
17. **Lois George** is a Commonwealth Scholar and Lecturer in Mathematics Education and Programme Coordinator for Mathematics Education at the School of Education, The University of the West Indies, Mona Campus in Kingston Jamaica. She has

approximately 20 years of combined work experience in the field of Mathematics Education and in secondary school management. She is especially passionate about engaging with innovative research and pedagogical strategies to help learners better understand and enjoy Mathematics. Her research interests include mathematical cognitive development, and technology use in mathematics education assessment.

18. **Timothy C. Guetterman** is an interdisciplinary, applied research methodologist specialised in mixed methods research. His methodological interest is to advance rigorous methods of quantitative, qualitative and mixed methods research, particularly strategies for integrating and intersecting qualitative and quantitative research. As a methodologist, Tim works across disciplines and internationally with collaborators. Much of his research is at the intersection of health and education or aims to improve health services. Funded by the National Institutes of Health (NIH), he investigates informatics technology to improve health communication and education. Tim is also actively engaged developing research methods capacity through foundation grants and the NIH Mixed Methods Research Training Program for the Health Sciences. He recently co-authored the sixth edition of *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research*, with John W. Creswell, adjunct professor from Pearson ([link is external](#)) ([link is external](#)). He also serves on the board of the Mixed Methods International Research Association Mixed Methods International Research Association ([link is external](#)) (MMIRA) and chairs the MMIRA Webinar Series.
19. **Anthea Henderson** is a lecturer and researcher at CARIMAC. Her research interests include digital childhoods, media and family life, and digital cultures.
20. **Dr. Ingrid Hunt-Anderson** is an adjunct lecturer at the School of Education, University of the West Indies (UWI) and the Vocational Training Development Institute, HEART Academy, Jamaica. Hunt-Anderson holds a Doctor of Philosophy (with high commendation) in Educational Psychology. In 2017, she received the Dean's award for Excellence in the Faculty of Humanities and Education, and UWI's Graduate Studies' award for the most outstanding doctoral thesis, also featured in their annual Research Publication in 2018. Hunt-Anderson's teaching assemblage include the Assessment of Teaching and Learning, Research Methods, Administrative Leadership in

Education and Psychology. She also supervises research students in education and teaching practitioners at both undergraduate and graduate level. Dr Hunt Anderson has facilitated research workshops and presentations at several regional and international events and conferences. She is a founding member and president of the International Mixed Methods Research Association- Caribbean Chapter; and, past co-chair of its Marketing and Communication Committee. Hunt-Anderson also serves as an associate editor for the Caribbean Journal of Mixed Methods Research and guest editor for the Caribbean Journal of Education's special issue on Transformational Research. Her research interests include the use of methodologies that will promote social justice and transformational change among adolescent and marginalized communities, and also, the development of creative, effective teaching strategies and assessment tools for meeting the needs of under-resourced classrooms in the Caribbean.

21. **Carmeneta Jones** is a lecturer in the Department of Language Linguistics and Philosophy at the University of the West Indies (UWI), Mona. She teaches Language and Ethics and foundation critical reading and writing courses to students pursuing degrees in the Faculties of Humanities and Education and Science and Technology and Medical Sciences. She pursued a PhD in Literacy Education at the UWI, Mona. She is a member of the International Society for the Advancement of Writing Research (ISAWR) as well as the National Council of Teachers of English (NCTE). She has conducted writing workshops for teachers at all levels of the Jamaican education system. Passionate about qualitative enquiry and action research, she is interested in phenomenology, males' education, data-driven instruction, mentorship in writing programmes, students' perceptions of their learning, literacy studies, students' writing experiences, student engagement and ownership, metacognition and arts-based instruction. Her essays have appeared in in *International Advances in Writing Research: Cultures, Places, Measures*, the *Caribbean Journal of Education* and *UWI Quality Education Forum*. She wrote a chapter for the edited volume. *Academic Writing and Rhetoric in the Anglophone Caribbean* which won two awards: Mina P. Shaughnessy Prize from the MLA and the Outstanding Book Award in the Edited Collection category from the Conference on College Composition and Communication

22. **Jasmin Lawrence** is a lecturer in the English Language Section of the Department of Language, Linguistics and Philosophy at the University of the West Indies. She is coordinator for the academic literacies course offered to students in the faculties of Science and Technology, Engineering and Medical Sciences. She has worked in the airline, banking and telecommunications industries but has been a career educator for over 25 years. Her research interests include Academic Writing, Constructivist Methodology, Transformative Teaching and Learning, Student Development, Teaching English as a Second Language (TESL) and Design Thinking in Education. She was selected as a UWI Distinguished Awardee for teaching quality in 2018.
23. **Rushelle Clarke-Lindsay** is a trained educator and librarian. She currently works as a lecturer and senior librarian at the Trench Town Polytechnic College. She received a bachelor's degree in Heritage Studies from the Mico University College (formerly Mico College) and a master's degree in Library and Information Studies at the University of the West Indies. Mrs. Clarke-Lindsay began her teaching career at the secondary level until February 2017, when she joined the college library department, as the college librarian. She oversees all the operations of the library and is responsible for acquiring, organising and providing access to a wide range of information and reading resources to meet the diverse needs of our library users. She is goal oriented and driven, which are personal traits that motivate her to aspire to be the best for her students. Mrs. Clarke-Lindsay loves to be engaged in spirited discussions and nurturing learners who have a steadfast commitment to their learning goals.
24. **Ruth Baker-Gardner** currently lectures in the Department of Library and Information at The University of the West Indies, Mona in Jamaica. She has over 30 years of experience as an educator at the primary level and holds a master's in library and Information Studies from The University and a PhD in Education Administration. Her research interest includes academic integrity, school libraries, and induction and mentoring.
25. **Schontal Moore** is a lecturer in Language and Literature for the School of Education at the University of the West Indies (UWI), Jamaica. She is the Graduate Coordinator and also Distance Education Standards Committee representative for the University Council of Jamaica. She completed the M. Ed. Educational Technology and English Language Teaching at the University of

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26. **Satoko Motohara** is a research project manager, Mixed Methods Program in the Department of Family Medicine, University of Michigan Ann Arbor. She has been coordinating the mixed methods and qualitative research training workshops (in-person and virtual) offered by the Program since 2015 and has co-authored chapters in *A Guide to Mixed Methods Research: A Treasure Hunt for Learning Research Design to Writing for Publication* by Tomi Shobo (Eds. Fetters and Kakai, 2021).
27. **Leah D. Garner-O'Neale** holds a PhD in Chemistry from the University of The West Indies (UWI), Cave Hill Campus (2003) and is currently a lecturer in Chemistry. While her initial research work was in the area of theoretical chemistry, she has made a transition to science education research. Leah believes that Science is integral in developing an enlightened citizen and productive economy. She is immensely passionate about teaching science and believes it is a major part of her purpose. This passion drives her enthusiasm for science education. Her research in this area focuses on the factors that influence the teaching and learning of Chemistry/Science from early childhood to the university level. She has mentored postgraduate students in the areas of theoretical chemistry, environmental chemistry and science/chemistry education. Dr. Garner-O'Neale was the recipient of the R. L. Seale Prize in Chemistry in 1998 and the Principal's Award for Excellence in the category of Outstanding Teaching in 2013.
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- the former Jamaica Broadcasting Corporation. She conducts research on various aspects of television programming and production, media regulation and technology issues.
30. **Rae V. Sakakibara** is a Research Nurse and associate of the University of Michigan Mixed Methods Program in the Department of Family Medicine. She has been involved in coordinating research training efforts in the Mixed Methods Program since the program was established in 2015. She has supported a number of qualitative and mixed methods health services and programme evaluation projects in the Department of Family Medicine.
 31. **Keisha Chandra Samlal** is a PhD Sociology Candidate at the University of the West Indies, St. Augustine Campus. She has a multidisciplinary background in Communication Studies and International Relations. Her current areas of research interest include Caribbean Fat Studies, Statistics Education, and Mentoring in Higher Education.
 32. **Leemoy Weaver** is an MPhil/PhD candidate in Sociology, specialising in development. Her core area of study is on child abuse and neglect. She is also a lecturer in research methods at the undergraduate level at the University of the West Indies, Mona Campus, Faculty of Social Sciences, and the Institute of Gender and Development Studies. She has experience in facilitating mixed methods research workshops for graduate students locally and internationally. She has been part of the team involved in the initial development of mixed methods research in the Caribbean region and is a member of the editorial board for the Caribbean Journal of Mixed Methods Research (CJMMR).
 33. **Steve Randolph Weaver** holds a PhD in Anthropology and his life-long work interlinks both the spiritual and physical aspects of health and healing which underlies his philosophy. He is a senior lecturer and has been a registered nurse for almost 40 years. He is also the immediate past Head of the UWI School of Nursing, Mona Campus, Jamaica having completed two terms in this position. Additionally, he is currently the MMIRA-Caribbean Chapter Manager and has been part of the team involved in the initial development of mixed methods research in the Caribbean region. He is the co-editor-in-chief of the Caribbean Journal of Mixed Methods Research.
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35. **Thisbe Lucas Usher** Education Chair in the Faculty of Education and Arts, at the University of Belize, is an esteemed educator for the past 24 years. She is a holder of a master's degree in educational leadership and has recently successfully defended her Doctoral dissertation, with the University of the West Indies, Cave Hill Campus. Her professional career has been in the field of Education. Throughout her years as an educator, Mrs. Lucas Usher has served in the capacity of a Primary School Teacher (13 years), Primary School Principal (5 years) and a lecturer at the University of Belize (6 years). Her greatest passion is helping teachers to reach their fullest potentials. She aspires to be a role model for teachers and makes an effort to be of service to others.
36. **Jose Reis-Jorge** José Reis-Jorge has a master's degree and a Ph in Education Sciences both from the University of Bristol, UK. Currently he is professor of Education and principal investigator at the Higher Institute of Education and Science/ISECLisboa, Portugal, and Doctoral Thesis Supervisor at the University of Liverpool. He was President of ISEC Lisboa (2003-2008) where he has also served as Director of the School of Education and Human Development, Chair of the Scientific Council, and Director for Research and Development. He was a Lector of Portuguese and Portuguese Culture at the Universities of Bristol and Hull, United Kingdom (1990-1918), and Honorary Senior Lecturer at the University of Liverpool / Laureate Online Education (2013-2020). He has taught classes and seminars at universities in Germany, Brazil, Bulgaria, Spain, Estonia, and Turkey. He is a member of the editorial board of *Teaching and Teacher Education* (Elsevier) and *Teaching in Higher Education* (Taylor & Francis). His main research interests are in Teacher Training and Professional Development, Pedagogical Supervision in Higher Education, Reflective Practice and Inclusive Education.

Introduction

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This volume of CJMMR is dedicated to the memory of Dr Joseph Powell, General Manager of UWI Press, who passed away on 27 April 2021. The journal maintains a multidisciplinary approach to selecting articles for publication. This volume remains consistent with the main scope of the journal, the utilization of the mixed methods research (MMR) approach for investigating various phenomena.

To our major sponsor of this volume, The School of Graduate Studies and Research, we are grateful for the support without which this volume would not come to fruition. Thanks to Professor Gift, Pro-Vice-Chancellor, Graduate Studies & Research, for his continued support to researchers at the University of the West Indies in equipping them through training programmes and providing the appropriate tools to produce quality research work in the Caribbean. Dr Lyn Keith, her knowledge and skills are impressive; we truly appreciate her support.

This volume focuses on three broad areas: research in higher education, social issues and non-empirical work broadening the use of mixed methods research. The articles concerning higher education involve an examination of students' readiness for online learning during the pandemic; assessment of five mixed methods workshops at the tertiary level; an examination of undergraduate students' expectations for performance in statistics; the low usage of a polytechnic library by the lecturers and students; and the perceptions of first-year chemistry students towards introductory physical chemistry. The second focus concerns research about social issues that include: understanding how crime is constructed in the media and public discourses; nursing students' knowledge and attitudes to child abuse and neglect; and examining the nature and prevalence of covert bullying. The non-empirical issues include a team of researchers reflecting on a collaborative mixed methods research process that examined media regulator policies and how the public perceives the

regulator; and the second paper examined the utilization of visual and arts-based approaches in mixed methods study. This second volume comprises 12 articles with 36 authors, including international, local and regional experts in mixed methods research. The articles span a wide range of interests within the mixed methods framework and provide opportunities for attracting a broad audience of researchers seeking to utilize mixed methodology in their individual areas of study. An important part of our mission is to support and expose new mixed methods researchers, and so for this volume, we included two doctoral abstracts. The summaries of manuscripts presented in this second volume of the CJMMR are given here.

Peggy Shannon Baker discusses art and artistic practices in mixed methods research when studying complex issues. More specifically, the author focuses on palimpsest as an arts-based strategy that can be integrated into mixed methods studies. The author defines palimpsest as "the layering of multiple 'texts' over one another". Texts are used "...in a hermeneutic sense, referring to a source that represents and communicates messages including written words, numbers, images and videos, physical structures, curriculum, policies, etc." Palimpsest has been used both "literal and metaphoric" in disciplines such as education, literature, architecture, visual computer programming and so on. In architecture, for example, palimpsest can be seen "where renovations in newer architectural styles or materials are added to older buildings". Using dialectics as a paradigm, Shannon Baker outlines a framework by which palimpsest can be integrated into a mixed methods study.

Rae V. Sakakibara et al., using convergent mixed methods design, reported on an evaluation of five mixed methods workshops conducted over two years by the University of Michigan Mixed Methods Program. Copies of a quantitative self-assessment survey with close- and open-ended items were administered to 132 participants who enrolled in five workshops between Spring 2016 and Summer 2017. In addition, pre-workshop skills data were collected, and follow up data were collected from the participants' mixed methods research skills gained through participation in the workshops. Data analyses were conducted separately for the quantitative and qualitative datasets, and joint displays were used to merge the results. The results suggest that persons from diverse backgrounds with a diverse research focus and varying skills in mixed methods research can come together in "a well-orchestrated mixed methods research workshop" and obtain training

relevant to their individual projects. Finally, the authors discussed the "implications for developing mixed methods curricula and evaluation of training".

Ingrid Hunt Anderson employed an exploratory sequential design underpinned by the transformational paradigm to investigate "the nature and prevalence of covert bullying among adolescents within the context of Jamaican socio-cultural, historical and economic environs" among adolescents in Jamaican high schools. Twenty-seven students from four schools participated in the qualitative phase, while 279 students from 7 high schools responded to the survey. Joint displays were used to present the combined quan and qual findings. There is a call by the author based on the integrated findings for school programs to address the "negative peer group structures and symbols that perpetuate deviance, rejection, social exclusion and gendered spaces".

Desiree Dornally Antonio; Jose Reis-Jorge and Julie-Anne Regan used an experimental sequential design to determine their participants' perspectives (teacher educators and education leaders) on factors that promoted or hindered the Continuing Professional Development of Teacher Educators and how these factors were manifested. Fourteen teachers were interviewed; the results from the qualitative phase were used to develop the instrument for the quantitative phase. Fifty-three teacher educators were invited to participate in the survey. However, only 28 teacher educators responded. The results suggested that proper systems and policies are needed to systematically address the CPD of the TEs as the study results revealed more "incidence of barriers to the TEs' CPD".

Rushelle Clarke and Ruth Baker-Gardner utilized a convergent mixed method case study design to identify and discuss the factors that impact students' use or non-use of a polytechnic library. One hundred and forty-three registered users of the library comprised the research population for the study. The participants included 107 students pursuing technical vocational training and 12 lecturers. Survey instruments were administered to students while interviews were conducted with lecturers. The findings revealed that though certain resources such as audio-visual materials, e-journals and some printed resources were underutilized, students of the Polytechnic institution utilized the library weekly for the following purposes: reprographic services, to conduct research, to seek help from the librarian and prepare for the practical session. In addition, the qualitative findings showed that students use of the

library were dependent on lecturers' use of printed and electronic resources and lecturers' emphasis on the use of the library to complete assignments.

Talia Esnard, Fareena Alladin, and Keisha Samlal examined undergraduate students' expectations for performance in statistics using an explanatory sequential approach. The quantitative phase aimed at investigating the relationships between students' values and expectations for performance in an introductory statistics course. They argued that values are embedded expectations. The components of values explored are *Utility* value that refers to individuals' "perceived personal or professional relevance or utility of the task/skills in the future", *Affect* relates to individuals' "feeling towards specific tasks", in other words, "their attitude toward learning statistics", *Attainment*, refers to the importance of doing well, and *Cost* "the perceived amount of effort required to complete a task". The researchers utilized the Statistics Anxiety Rating Scale (STARS) and the Survey of Attitude Towards Statistics (SATS-28) to examine students' values. Students Expectation score for Performance was calculated using a 15-items scale. The qualitative phase explored "students' construction of the values (related to numbers, words, people) and the impact on their expectations towards statistical performance". The authors summarized the integrated findings by stating, "in both the quantitative and the qualitative data, value assessments based on all four components remained critical to the average to high expectations for performance in statistics" for the undergraduate participants.

Lois George, Glenda H. E. Gay, Loraine D. Cook, and Schontal Moore examined the impact of moving students from a traditional face-to-face teaching/learning environment to a fully online teaching modality in Jamaica. This convergent mixed methods study compared university students' reported readiness for engaging in online learning within this context, with lecturers' views of the challenges that students experienced with the transition to emergency remote learning. Quantitative data were collected from 132 university students in one department using an online survey, while qualitative data were collected from 19 lecturers who taught a total of 40 courses within the same department using a questionnaire with open-ended items that was disseminated via email. One key finding is that most students reported being technologically prepared, but exhibited poor technical aptitude, online study skills and weak online learning lifestyles that are required for engaging in online learning. This finding was corroborated by lecturers who also

noted that some students appeared to be unfamiliar with technology tools. The findings suggest that instruction should be organized in ways that accommodate students' technical challenges.

Anthea Henderson, Livingston A. White, Loraine D. Cook, Olivia Bravo, Corinne Barnes and Yvette Rowe conducted this study utilizing a convergent mixed method design deploying quantitative and qualitative methods over an eight-month data collection period. The data collection methods included a national quantitative survey; a quantitative content analysis of programmes aired by the electronic media sector; focus group discussions with specially selected media audience members; and semi-structured interviews with media managers. This paper presented a reflection on the design and implementation of a mixed methods study commissioned by a regulatory body. The paper argues that the reflection process may be beneficial for both experienced and novice researchers as they learn how to use lessons from past research efforts to inform future research plans involving mixed methods. The researchers conclude that in limited-resource environments, multidisciplinary research teams can be ideal for the efficient use of scarce resources such as specialized knowledge and funding.

Carmeneta Jones and Jasmin Lawrence used a fully integrated mixed methods design as Schoonenboom and Johnson (2017) discussed to examine university science students' agency in delivering a critical reading and writing course. This transitioned into the formulation of the following hypothesis the tertiary level science students will attain the best outcomes when they play agentic roles in the pursuit of their foundation critical reading and writing course. The findings are organized using the following themes: students' critical reading and writing concerns; student agents' plans of action; self-monitoring of progress and student agency; student agency; advice for prospective students. The quantitative data integrated into the reporting of the qualitative was used to numeric insights into the qualitative and vice versa. The authors' main conclusion was, "The participants realized that there were benefits to be derived from the choices that they made to purposefully apply principles of metacognitive theory, self-monitoring, student-regulated learning, student-ownership, student-centred learning and student engagement."

Zhané Bridgeman-Maxwell and Leah Garner-O'Neale used a mixed methods approach to examine the perceptions of first-year chemistry students towards introductory physical chemistry and the

appropriateness of instructors' teaching of the content, at three campuses of the UWI–Cave Hill, St. Augustine and Mona Campuses. The sample size utilized was 474 students using a perceptions survey (Quantitative Phase), and interviewed 46 students while observing the classroom climates (Qualitative Phase). A statistically significant difference in students' perception towards physical chemistry and perceptions towards the appropriateness of teaching methods utilized emerged based on campus of study. In addition, the findings revealed a positive relationship between the appropriateness of methods used and students' perception towards physical chemistry at each campus. Within the qualitative phase, the key themes were physical chemistry is conceptually difficult, mathematically intensive, and abstract and linked to the teaching strategies used by the instructor. Additionally, classroom climates varied from campus to campus and were linked to instructor disposition, student disposition and the teaching strategies utilized.

Janelle Zorina Matthews utilized a concurrent embedded mixed methods study to gain an understanding of "how public crime perceptions come to be, how they compare with official crime data, and to identify which crime frames most resonate with the populace". The mixed methods data collection was conducted in a single phase involving multiple data collection techniques. Interviews and focus group discussions were conducted to explore how Antiguans "think and talk about crime" and document analysis of newspaper coverage of crimes. Also, a trend analysis of police recorded figures concerning crime was generated for 50 years (1970 to 2020); this trend analysis determined the "overall scale of crime, the relative incidence of different types of offences, trends in those offences over time and their geographical distribution". The findings from the integrated data analysis show two different narratives with respect to crime and crime policy in Antigua and Barbuda.

Leemoy Weaver and Steve R. Weaver utilized a convergent mixed methods design to examine nursing students' knowledge and attitudes to child abuse and neglect (CAN) and to explore their views on the extent to which BScN provides exposure to CAN. Three hundred and twelve student nurses completed the survey, while 21 female nurses voluntarily participated in focus group discussions. The findings revealed that, on average, students had moderate to high knowledge of CAN. However, in the focus groups, students expressed that they did not develop their confidence and competencies in identifying suspected cases of CAN from the curriculum.

The Palimpsest as an Arts-Based Integration Strategy for Mixed Methods Research

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Abstract

As mixed methods are increasingly used to address complex problems and contexts, researchers need methods to explore those complexities. Arts-based integration strategies offer one opportunity to address this need. The purpose of this article is to introduce the palimpsest as an arts-based integration strategy for mixed methods researchers. Palimpsest refers to layering multiple "texts" (words, numbers, visuals, etc.) on top of one another. Palimpsests can be found in architecture, visual computer programming, literature, urban planning, public health, and education. Grounded in dialectics, arts-based research, and integration approaches to mixed methods research, I introduce the palimpsest as a: metaphor, braiding and layering integration strategy, and transformation integration strategy. I offer several considerations, asking: who creates the palimpsest and the impact its creation might have, how the palimpsest will be made including whether it needs to be easily "read" for analysis and/or to or only: for analysis or interpretation, and how it may influence the meta-inferences derived from a mixed methods research study.

Key words: mixed methods; integration; palimpsest; arts-based research; arts-based mixed methods; visual methods; dialectics.

Introduction

As mixed methods research continues to address complex problems and research contexts, researchers have sought methods to explore those complexities (Poth 2018, 2020). One approach has been the integration of art and artistic practices into mixed methods studies (Smith and Shannon-Baker, forthcoming). This integration includes using art as a

form of data to be analysed and integrating art with other forms of data (e.g., Edwards and Creamer 2018; Feen-Calligan and Matthews 2016; Gould et al. 2018; Ridgway, Mason-Whitehead, and McIntosh-Scott 2018; Shannon-Baker 2015; Syyeda 2015; Ubha and Cahill 2014). Some mixed methods researchers use art to aid in knowledge production and translation (Fraser and al Sayah 2011). Arts-related approaches in these cases offer an innovative way to explore convergence and divergence in data sets (Edwards and Creamer 2018; Watson 2020), communicate what is difficult to put directly into words or in a way that is more accessible to others (Gerstenblatt 2013; Fraser and al Sayah 2011; Wilson and Moffett 2017), and inspire evocative responses from research stakeholders (Bagley and Castro-Salazar 2012; Richards, Lawthom, and Runswick-Cole 2019; Shannon-Baker 2015). Art and artistic practices can help researchers engage in reflexivity about their methods throughout the research process especially when conducting research in teams (Watson 2020; Wilson and Moffett 2017). However, the use of artistic practices as a form of analysis or integration in mixed methods research remains undertheorized (cf. Shannon-Baker and Edwards 2018).

The aim of this article is to introduce the palimpsest as an arts-based integration strategy for mixed methods research. A *palimpsest* generally refers to the layering of multiple "texts" over one another (Dillon 2007). "Text" here is intended in a hermeneutic sense, referring to a source that represents and communicates messages including written words, numbers, images and videos, physical structures, curriculum, policies and so on (Caputo 1987; Ricoeur 1974/2011). Literal and metaphoric palimpsests can be found in architecture, visual computer programming, literature, memoir studies, urban planning, public health, and education (Blackwell 2014; Goulding, Walter, and Friedrich 2013; Lachapelle 2020; Marshall et al. 2017; Rose 2016). By examining its use across these disciplines, we can better envision the transferability of the palimpsest as an integration strategy for mixed methods researchers.

I first begin with a discussion of the frameworks that inform this work: dialectics as a philosophical paradigm and my conceptualizations of arts-based and mixed methods research. Next, I describe the foundations for integration in mixed methods that align with using the palimpsest as an integration strategy, that is, as the combination or mixing at "the interpretation and reporting level" (Fetters, Curry, and Creswell 2013, 2134) using merging and transforming types of integration strategies (Creswell and Plano Clark 2018; Fetters, Curry, and Creswell 2013). Then, I outline the use of the palimpsest across several disciplines, including as a

metaphor for understanding the impact of powerful or traumatic experiences, as a technique for braiding and layering stories together to come to communal understandings about a shared experience, and as a form of transformation to distil down or change the meaning of a text. Envisioning the palimpsest as a form of arts-based integration, I then discuss several considerations mixed methods researchers should address when using this technique: who creates the palimpsest, how, its “readability” and the impact it has on whomever creates it, the research process, and the meta-inferences of a mixed methods study. I conclude with final recommendations and areas for future research related to using the palimpsest as an arts-based integration strategy.

Frameworks

Dialectics

This work is based on *dialectics* as a philosophical paradigm. This paradigm demonstrates a dialogue between philosophies, discourses, practices, beliefs, and data sets (Greene 2007; Greene and Hall 2010). Specific to mixed methods research, dialectics has been used as a framework for stressing diverse perspectives and complexity (Greene and Caracelli 2003). Taking a dialectic stance refers to engaging in respectful, intentional, and meaningful dialogue about differences and tensions “to achieve a dialectical discovery of enhanced, reframed, or new understandings” (Greene 2007, 69). With respect to bringing together data, dialectics is especially interested in the convergence and divergence of data sets and the unique inferences drawn from this dialogue (Shannon-Baker 2016). Dialectics is an important paradigmatic perspective for the palimpsest. This philosophical paradigm reinforces the importance of discussing the processes and results of bringing together texts. The palimpsest as a form of integration similarly emphasizes the synergies, complications, tensions, and expansions through the processes and products of layering data and findings.

Arts-Based Research

Arts-based research is a research methodology that places artistic processes and practices at the centre of the overall research process (Leavy 2015; Sinner et al. 2006; Slattery 2003). Artistic processes could be considered the processes of artmaking (e.g. planning, experimentation), consideration of form and representation of data and inferences, attention to aesthetics, consideration of audience responses to the art and so on. Artistic practices are then the actual procedures for making art. In

this way, arts-based research emphasizes the practices, processes, and products of research (Sinner et al. 2006). In arts-based research, art and artmaking can be considered the data, a data generation strategy, a method of analysis, and a form of representing the inferences or outcomes from the study. Arts-based research has many affordances including inciting deeper questioning (Barone and Eisner 2006; Eisner 2008), promoting community involvement in the research process (Lincoln 1995), and utilizing "alternative formats" to make research more accessible to those outside of academia (Sinner et al. 2006, 1225). I characterize the palimpsest as an arts-based research strategy because it focuses on the processes and practices for layering texts as well as the palimpsest created as a result.

Mixed Methods Research

Mixed methods research is philosophically grounded methodology that intentionally mixes multiple methodological approaches in a single research study (Shannon-Baker 2016). Multiple methodological approaches, rather than using a qualitative–quantitative binary, refer to the combination of arts-based, qualitative, quantitative, and other methodologies (Watson 2020). In general, the mixing can occur at various levels (e.g. philosophical, methodological) and stages (e.g. during sampling, after data analysis) in a mixed methods study (Greene 2007). Mixed methods researchers are particularly interested in the integration, or the mixing, whereas multi-method researchers focus more on using "complementary" methodologies or various methods (techniques) in a single study (Anguera et al. 2018, 2765; Bazeley and Kemp 2012). This means that the mixing is done intentionally, building on the strengths of each methodological approach, to uncover new nuances within a phenomenon that would not be possible when using a single methodology (Creswell and Plano Clark 2018; Morse and Niehaus 2009; Teddlie and Tashakkori 2009). Within this conceptualization of mixed methods research, I envision researchers using the palimpsest as an integration strategy in either arts-based mixed methods research (ABMMR) or arts-informed mixed methods research (AIMMR), where making art including the palimpsest is either central to the overall study or used to supplement other methodological and integration approaches, respectively (Smith and Shannon-Baker, forthcoming).

Strategies for Integration in Mixed Methods Research

Integration is a fundamental component of mixed methods research (Fetters, Curry, and Creswell 2013). Although integration can occur at

many levels, for the purposes of this article, I focus on the form of integration that Fetters, Curry and Creswell refer to as "integration at the interpretation and reporting level" (2013, 2134). *Integration* here refers to the intentional connection, mixture or blending of data and findings from the multiple methodological approaches used in a mixed methods study (Creswell and Plano Clark 2018). Integration approaches align with the purposes of the study, including identifying more reliable findings, enhancing current understandings, and developing new knowledge (Bazeley and Kemp 2012).

Strategies for integration in part depend on the timing of the mixing and what is being mixed. Two of the types of integration from Creswell and Plano Clark (2018) are helpful for this article: merging and transforming. *Merging* refers to comparatively analysing multiple data sets and is used in most mixed methods designs regardless of timing. This type of integration can take the form of an integrated discussion of findings (e.g. Lee 2013) or in the creation of a joint display. A *joint display* refers to a visual created as a result of merging data or findings together (Fetters, Curry, and Creswell 2013). This can take the form of a table (e.g. Peroff et al. 2020; Shannon-Baker 2015) or another type of visual (e.g. Bustamante 2019; Usher et al. 2019). *Transforming* refers to converting one form of data into another form of data for further analysis. Transformation is used in combination with merging integration strategies (e.g. Hillard, Ryan, Gervais 2013) where the newly transformed data is integrated and analysed anew (Fetters, Curry, and Creswell 2013). *Quantitizing* is one common form of transformation that involves converting other forms of data into quantitative data to then be quantitatively analysed (e.g. Akkus 2013; Cooper et al. 2012). *Qualitizing* is a form of transformation where data are converted into qualitative text-based data (Teddlie and Tashakkori 2009).

Some researchers have used artistic practices to transform data into evocative art, performances, and presentations (e.g. Bagley and Castro-Salazar 2012). For example, in a study by Wilson and Moffett, "choreographers, researchers, educators, visual artists, musicians, poets, and postsecondary dance students" (2017, 136) transformed survey data, transcribed discussions, and students' written and performative coursework into a final performance of poetry, dance, and music. Wilson and Moffett argued that integrating artistic practices across multiple mediums was vital in teaching and learning about dance and engaging students' emerging dance knowledge and skills. It also aided communication across disciplines, communities and countries among the people involved in

the project (Wilson and Moffett 2017). The creation of visuals and art as a form of analysis or integration presents innovative opportunities for mixed methods researchers (cf. Shannon-Baker and Edwards 2018). The palimpsest presents both a metaphor and an art form that could be beneficial in mixed methods researchers' arts-based integration analyses.

The Palimpsest: A Metaphor and Art Form

A *palimpsest* refers to the product of erasing, scratching away or writing over an old "text" with one or more newer "texts" where "text" refers to any form of communication including numbers, quantitative results, written stories, visual art and so on. Historically, scraping and erasing the original text were strategies used to save materials when publishing new written documents since the scraping process removed the original text in a way that it could no longer be seen by the naked eye. With new infrared scanning technologies, both the old and newer texts can be seen, the Archimedes Palimpsest being one famous example of this phenomenon. However, as Dillon (2007) points out, although the Archimedes example has become recognizable in some circles, palimpsests actually exist in many other forms. Palimpsests can be found in architecture where renovations in newer architectural styles or materials are added to older buildings (Dillon 2007) as in figure 1. They can also be seen in visual programming (Blackwell 2014), transgender and memoir studies (Rose 2016),



Figure 1: Photograph of a building demonstrating palimpsests in architecture

urban planning and development (Marshall et al. 2017), public health (Lachapelle 2020) and curriculum and pedagogy (Goulding, Walter, and Friedrich 2013). There are also several types of palimpsests based on the relationship between the texts being layered, from plagiarizing and quoting to abstract allusions (Genette 1982). More generally, palimpsests "embody and provoke interdisciplinary encounter, both literally [...] and figuratively. [...] The palimpsest becomes a figure for interdisciplinarity" (Dillon 2007, 2).

Dillon establishes a framework for uses of the term palimpsest. *Palimpsestuousness* refers to "a simultaneous relationship of intimacy and separation", allowing for the preservation of each text as well as their "contamination and interdependence" (2007, 3). Thus, *palimpsestuous* refers to a relationality, an intimacy of the texts being layered together. Layering, according to Dillon, identifies accidents, divergences, and changes between the texts being layered. *Palimpsestic* then refers to a process of layering. This process helps to reconsider each layer in light of its overlapping with other layers as well as the ideas and stories generated as a whole (Dillon 2007).

The palimpsest, like the rhizome (Deleuze and Guattari 1987; Honan 2007), neither has an origin nor an end point. This characterization has some significant implications. First, this means that there cannot be a hierarchy of the texts. One text is not more important than the other. Instead, what becomes the focus over time and with more layers is the process as much as the individual texts and new creations made through creating the palimpsest. This can be seen in the use of palimpsests as a methodology, literally layering texts of different accounts of the same event from various perspectives (e.g. Binswanger, Samelius, and Thapar-Björkert 2011).

Second, if the palimpsest operates like a rhizome, this means that it can be continually worked with, both literally and figuratively. Whether a third text is added on top of two others, or as each new reader provides another layer of meaning to the text, the work of the palimpsest is never finished. It can continually be built upon. This unfinished nature echoes the same thinking about writing as a method of inquiry (Richardson 2003).

Palimpsest as a Metaphor

Metaphors are helpful representations that draw connections between something new to something known (Bazeley and Kemp 2012). Metaphors are helpful heuristics for envisioning integration and the

mixed methods research process (Bazeley and Kemp 2012; Cronenberg and Headley 2019; Knappertsbusch 2020). Metaphors in arts-based mixed methods research can help communicate the practices used to integrate, shifts in study procedures over time, and interpretation processes (Watson 2020). Similarly, the palimpsest as a metaphor offers a way to envision integration through layering data and findings as different sets of texts. Metaphoric use of the palimpsest has been traced back to a 1931 text by Edmund Wilson (Lara-Rallo 2009). The palimpsest can be used as a metaphor to examine how the past, present, and future intersect (e.g. Avramopoulou 2020; Lachapelle 2020). For example, Lachapelle (2020) used the palimpsest as a metaphor to explore the emotional geographies that people who were formerly incarcerated experience when they reintegrate into their communities. Using narrative inquiry, Lachapelle's work showcases how "the experience of re-entering the community after prison is akin to the creation of another layer of a palimpsest, painstakingly scraping off the past script of the prison routine and attempting to re-write a life 'after' prison with little to no institutional support" (2020, 102). The discipline and "rhythm" of their experiences while incarcerated get scripted onto their bodies, emotions, and psyche (Lachapelle 2020, 112). Lachapelle attributes the constant presence of one's experiences in prison as a "ghost" text that continuously haunts the present. Fürst (2017) similarly investigated ghost texts in her analysis of short stories about Caribbean women. Fürst found that protagonists' bodies in the short stories became palimpsests: lived embodiments of the voices of the women's ancestors, inter-generational trauma and "a space for physical and emotional healing" (2017, 68). As a metaphor, the palimpsest can be applied in many disciplines to highlight the real and metaphoric layering of experiences and metanarratives.

Palimpsest as a Braiding and Layering Technique

A palimpsest made by layering texts resembles a kind of braided narrative (Tedlock 2011; Watson 2020). As an analytic technique, braiding narratives brings together findings across data sets and team members' perspectives in a research project (Watson 2020). Braiding one's own stories or braiding stories with others can highlight how stories are culturally situated, encourage critical reflection, and critique the notion of a single, essentializing story about a phenomenon (Brigham 2011). Using a collage technique, a palimpsest can be built over time where each new layer that is added can help identify connections between overt and subtle

meanings (Davis and Butler-Kisber 1999). Writing over old texts can be a powerful metaphor for those working through traumatic experiences (e.g. Binswanger, Samelius, and Thapar-Björkert 2011).

At times, the layering of the texts on top of one another can reveal new meanings as well as shroud original meanings. While making a palimpsest, the texts being braided or layered can become obscured. For example, in my own attempts at literally weaving lines from my research notebook, the resulting palimpsest became unreadable in a conventional sense (see figure 2). This prompted me to ask questions about how to interpret palimpsests (or other visuals) and how my own understanding of “reading” images is socially constructed. In other words, a palimpsest may be “read” in a traditional sense or not, just as the original texts may be intended to be visible or not depending on the creator’s intent.

Palimpsest as a Form of Transformation

Another palimpsest technique is the erasure, scraping, removal or covering of an original text to transform it into a new text. Those who use this technique might do so to demonstrate how a text, such as a book or printed report, is a physical artefact beyond the content such as the

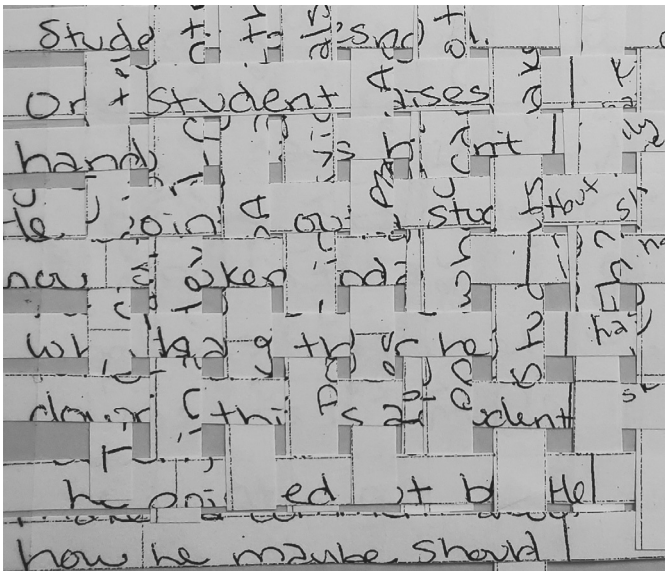


Figure 2: Detail of my own experimentation with creating a woven-based palimpsest using photocopies of pages from one of my research journals

statistical analyses, written descriptions, and other visuals it may share (Rose 2018). One example of removal technique is Jonathan Safran Foer's (2010) *Tree of Codes*. This is an example of a die-cut book where Safran Foer cut away parts of an English translation of Bruno Schulz's *The Street of Crocodiles*. Emily Rose (2018) adopted this technique in a thesis on translations of trans identity among several novels. Rose used the die-cut technique long with one removing the letter "I" in a translation of *Sphinx* by Anne Garréta (1986). The spaces between words on the page force the reader to slow down to consider the new meanings generated in this transformation. In Rose's case, the use of these palimpsestual methods demonstrates how "the line between original writing and translation is very thin" (2018, 200).

Another example of this technique is Tom Phillips's (2016) *A humument: A treated Victorian novel*. This palimpsestic opus showcases over 50 years of Phillips's work transforming each page of William H. Mallock's book *A human document* into pieces of visual art. Phillips's transformations expose some words and phrases while blocking out, colouring over, and drawing on top of the rest of the page, creating the story of a new character, Bill Toge (Bill as the short form for William and toge as a short form for "together" which appeared on the first page that Phillips found "bill" in the original text). In all of these examples of using palimpsestic methods to transform an existing text, the palimpsest created calls attention to how the act of reading a text is a social construction, that is, there is an expected series of actions when one reads a page or a book as a whole (Rose 2018).

Considerations for Mixed Methods Researchers Using the Palimpsest

The previous section described some of the ways that the palimpsest has been used as a metaphor, a braiding and layering technique, and a form of artistic transformation. In this section, I offer several methodological and ethical questions for mixed methods researchers to take into account when using the palimpsest as an arts-based integration strategy: who is making the palimpsest, how is it made, how it will be read or interpreted later, and what is the impact of the palimpsest on meta-inferences. What questions should mixed methods researchers ask while using this arts-based integrative strategy?

Researchers should consider who in the inquiry process should make palimpsests from the texts of the inquiry (e.g. statistical reports, written summaries). Asking who creates the palimpsests highlights how this

method of integration has implications for the researcher and participants. Creating palimpsests can help participants work through difficult experiences. For example, one study compared fictional and actual accounts of intimate partner violence to investigate transformative narratives and actually *create* a transformative narrative, helping participants attest to these experiences of abuse and work through them (Binswanger, Samelius, and Thapar-Björkert 2011). In other words, the researchers took careful consideration of who was layering and the impact of this activity on them while using the palimpsest method. Also, creating palimpsests, like other arts-related research practices, can help participants further reflect on their experiences (e.g. Edwards and Creamer 2018; Shannon-Baker 2015). As a result, this may also help create deeper relationships between the researcher and participant through sharing more of their experiences and exploring a phenomenon in more detail.

Mixed methods researchers should also consider how the palimpsests are made. The choice in materials and how to layer/braid/erase/remove/transform, for example, should reflect intentional choices on behalf of whomever is making the palimpsest and the messages they want to portray. In what ways can the creator of a palimpsest make intentional choices about which practices are used (layering, braiding, erasing, removing, transforming), how they are used, and why? Should elements that diverge be layered in a way that obscures one another or should they be placed the furthest away? Experimentation with and the final use of specific methods for layering texts in the creation of a palimpsest require researchers to engage on a deeper level with the data, particularly around the relationships between data sets as well as between specific methods used and the original analyses. Asking questions of how to make palimpsests also means tapping into the potential emotional reactions to creating them (cf. Brigham 2011). Some methods, such as cutting, scraping or covering parts of a narrative, may evoke emotional reactions.

The use of palimpsests as an integration method, particularly when the palimpsest is shared with others, complicates the audience's interaction with the research – a challenge faced by arts-based researchers in general (Barone and Eisner 2006). For example, the layering of one text on top of another can reveal new meanings as well as literally obscure others. In this way, the palimpsest is messy, largely unpredictable and a new text on its own, telling the story of the layered texts and their relationship with one another. There is also a complicated element of access and visibility to palimpsests. In some cases, the original texts are intended to show through or not in other cases. However, the reader must have the

contexts of all texts in order to better interpret them – the original text, the added texts, and the whole palimpsest. Otherwise, the deeper meaning behind their relationships might not be as apparent. For example, in the case of architecture, without have an understanding or knowledge of the older architectural motifs, these original architectural features become lost and unseen in the palimpsest. Therefore, the question of accessibility with the palimpsest becomes important in order to understand the texts that are included. The implication of this challenge to using the palimpsest as a method of integration then is that researchers must critically question what the final product will look like if it is intended to be shared with others.

Finally, mixed methods researchers should consider the generative potential of the palimpsest in the process of identifying meta-inferences. A *meta-inference* refers to the conclusions drawn from integrating inferences from the multiple methodological strands in a mixed methods study (Teddlie and Tashakkori 2009). Rather than simply reporting qualitative and quantitative findings separately, meta-inferences derive from using one or more integration strategies to combine, mix or transform those findings. Meta-inferences may identify new nuances to the phenomena or methodological gaps between the methods used (Teddlie and Tashakkori 2009). While making a palimpsest, mixed methods researchers should consider how to layer elements together when other analytic strategies demonstrated convergences and divergences. For example, how can the layering process demonstrate the convergences or divergences? Strategies such as erasing and removing or spreading the relative placement of findings in the palimpsest could demonstrate those divergences, whereas symbiotic layering and blending could demonstrate convergence. How can other integration strategies be used to justify certain artistic choices in the creation of the palimpsest? How do the practices used to make a palimpsest evoke new meta-inferences? As mixed methods researchers experiment with this arts-based integration approach, further questions and dialogue may surface.

Implications and Future Directions

The purpose of this article was to introduce the palimpsest as an arts-based integration strategy available to mixed methods researchers. In presenting this potential strategy, I discussed how the palimpsest has been used in many disciplines as both a metaphor and an art form, as

a technique for braiding and layering "texts" together (whether the "text" a collection of written words, numbers, visuals, etc.), and as a form of transforming texts into new creations. I have also offered a discussion of several considerations that mixed methods researchers should take into account when using this arts-based integration strategy including who creates the palimpsest, how and its impact on the creator, the research process and the meta-inferences found in the study. To conclude, I offer final implications and thoughts on the future directions for the use of this strategy.

The palimpsest offers a unique and evocative arts-based integration strategy for mixed methods researchers. The palimpsest at its core embodies a dialectic method where the layering process and product help explore the dialogue between data sets and findings. One's own philosophical paradigms will impact the artistic practices used since paradigms are informed by our axiologies and epistemologies about stories, data, who creates them and our concerns about aesthetics, validity, rigour and quality. Maintaining a reflexive stance on the decisions made in creating palimpsests will help to document this impact. Mixed methods researchers in their own work and in theorizing their methods should continue to explore the impact of dialectics and other philosophical and theoretical frameworks on their use of the palimpsest.

The palimpsest stands to offer generative meta-inferences for mixed methods researchers both in terms of exploring the phenomenon being studied and in terms of imagining the possibilities of convergence and divergence between multiple methodological approaches. Mixed methods researchers interested in this approach should practise and experiment with different techniques for creating palimpsests in their own work, ask questions about which methods are more evocative and why and document those practices. Future research can provide more specific discussions on practices for creating various types of palimpsests as well as their impact on the research process and the people involved.

Additionally, future research should investigate the merging and transforming of quantitative data and results in palimpsests. Much of the examples discussed in this article depict studies that were more arts-based or qualitative-oriented. How can quantitative results be meaningfully layered with or on qualitative and arts-based data? What would qualified findings look like in a palimpsest? There are many opportunities to explore the methodological and conceptual implications for using palimpsests as an arts-based integration strategy in mixed methods research.

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An Evaluation of Mixed Methods Research Training Workshops to Enhance Skills

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Abstract

Empirical research concerning mixed methods research skills development is limited despite the growing number of students and researchers participating in mixed methods research courses, workshops, and other training opportunities. Using a convergent mixed methods design, we conducted a long-term evaluation of five mixed methods workshops conducted over two years by the University of Michigan Mixed Methods Program to empirically assess mixed methods skills development. An intramethod data collection approach was used, in which quantitative and qualitative data were collected concurrently using a survey consisting of quantitative self-rated mixed methods skills items and open-ended workshop evaluation questions. In the fall of 2017, the survey was distributed to individuals who enrolled in workshops conducted between Spring 2016 and Summer 2017 to understand longer term application of mixed methods skills. Data analysis consisted of descriptive statistics, mean comparisons of follow-up self-assessment skills data with pre-workshop skills data, and thematic analysis of open-ended responses. Quantitative and qualitative data were analysed separately, and results were merged through joint display. We received forty-two valid responses. In the follow-up survey, participants reported having significantly higher mixed methods knowledge and skills compared to pre-workshop assessment data. Seven participants (17.1%) reported they published peer-reviewed mixed methods articles and seven participants (17.1%) reported they received grant funding for mixed methods projects since attending workshops at the University of Michigan. Qualitative analysis revealed four themes providing information about workshop experiences that helped participants achieve scholarly outcomes and skills development. These were 1) hands-on approaches to learning, 2) expert and peer feedback, 3) helpful topics, and 4) optimal timing to attend workshops. Based on these

findings, we present recommendations for teaching approaches that can help learners effectively build mixed methods skills.

Key words: mixed methods research; convergent mixed methods design; research skills; evaluation; teaching.

Introduction

Mixed methods research is a research approach that integrates qualitative and quantitative methods to draw new insights about the problem under investigation (Creswell 2014). In recent years, mixed methods research has been used by scholars in various fields, including health sciences, education, social sciences, business and nursing (Andrew and Halcomb 2009; Cameron and Molina-Azorin 2011; Curry and Nunez-Smith 2015; Mertens 2015; Teddlie and Tashakkori 2009). Further, mixed methods projects are increasingly receiving funding from major funding sources such as the United States National Institutes of Health (Coyle et al. 2016). As mixed methods research gains popularity across disciplines and around the world, individuals increasingly are seeking training in mixed methods research. To build mixed methods research capacity among individuals and institutions, universities offer courses, typically at the graduate or postgraduate level. Numerous organizations also host short workshops to provide intensive training over one to five days. For instance, the Mixed Methods International Research Association (MMIRA) hosts annual conferences with workshops, free webinars, and massive online open courses (MOOCs) that are attended by students and faculty-level researchers from across the globe. Mixed methods research training tailored to the needs of specific geographical areas is also emerging through regional MMIRA chapters, such as the Latin-American Association of Mixed Methods Research (dos Santos et al., 2020).

Mixed methods teaching has been extensively discussed in the literature, especially because of the unique challenges faced when teaching mixed methods (Bazeley 2003). One of these challenges is determining the appropriate breadth and depth of content covered in the course (Greene 2010) since mixed methods courses often attract interested learners with various levels of research training and different orientations to research (Ivankova 2010). In mixed methods research courses, the literature encourages presenting course topics sequentially, introducing learners to each stage of the mixed methods research process (Christ 2010; Onwuegbuzie et al. 2010; Earley 2007). Proposed topics to cover include

understanding philosophical assumptions of mixed methods research, formulating mixed methods research questions and purpose statements, identifying mixed methods designs, determining sampling strategies, data collection, analysis, and integration strategies, validating mixed methods findings, and writing up mixed methods results (Bazeley 2003; Ivankova 2010; Christ 2009; Poth 2014; Onwuegbuzie et al. 2013).

Beyond mixed method theory development, mixed methods skills have been found to be best acquired through experiential learning (Bazeley 2003; Guetterman et al. 2018; Poth 2014). Learning activities in mixed methods courses tend to focus on planning or designing mixed methods projects, with course assignments requiring students to draw visual models of their mixed methods design, procedures for their proposed study and preparing a mixed methods grant proposal (Christ 2009; Ivankova 2010). These activities emphasize the interrelatedness of the research questions and methods. This helps learners gain skills in clarifying their rationale for using a mixed methods approach and selecting an appropriate mixed methods design for their projects (Guetterman 2017; Robinson 2010; Collins and O’Cathain 2009). These activities are also practical, considering a full mixed methods study is not likely to be carried out during a few-day-long or even semester-long course (Bazeley 2003). However, because integration is the hallmark of mixed methods research (Fetters, Curry, and Creswell 2013), incorporating learning activities to help students gain skills in purposefully integrating qualitative and quantitative research methods requires creativity. Some experiential learning may occur through working with sample data (Bazeley 2003), critiquing mixed methods papers in the learner’s area of study (Ivankova and Plano Clark 2018; Poth 2014) and using exemplar articles to help clarify integration strategies and concepts (Greene 2010).

While there has been considerable work on pedagogical approaches to teaching mixed methods, there are far fewer studies with an evaluation component of implemented mixed methods courses. Further, published work on these evaluations of mixed methods courses has focused on learner satisfaction and teacher experiences by analysing course evaluation forms (Christ 2009; Ivankova and Plano Clark 2018; Ivankova 2010). Consequently, little has been published about assessing the learning outcomes of mixed methods workshops and courses despite the thousands of individuals who participate yearly (Guetterman 2017; Guetterman et al. 2016). For instance, while Poth found that mixed methods skills increased among education students who participated in a doctoral-level mixed methods research course, the study was not designed to investigate long-term

applications of mixed methods skills (e.g. mixed methods publications) (2014). Further, Guetterman and colleagues found that among faculty-level scholars in the health sciences, participation in a mentoring-based mixed methods training program significantly improved their ability to define and apply mixed methods concepts, and led to considerably more publications and grant submissions for mixed methods projects compared to non-mixed methods projects (2018). While this study showed promising results in terms of quantitatively measured training outcomes, it lacks information about the mechanisms (i.e. motivation, workshop experiences) that led to favourable workshop outcomes. Adding qualitatively explored "process-related questions" (Mertens and Tarsilla 2015) to the evaluation tool would have been helpful in evaluating the quality of implementation of the mixed methods training (White 2013), the relevance of course content to the audience and facilitators or barriers to gaining mixed methods skills. To this end, a convergent mixed methods approach to evaluating mixed methods research training programs would be particularly useful, in which quantitative findings and qualitative findings are merged to provide a more comprehensive understanding of mixed methods skill building (Palinkas, Mendon, and Hamilton 2019).

Assessment of learning outcomes is important for both formative and summative evaluation purposes to guide mixed methods teaching. We argue that assessment is a critical and influential component of any mixed methods research skill-building effort. An enhanced understanding of how individuals best learn mixed methods helps instructors ensure their courses and workshops lead to meaningful learning outcomes (Jonson, Guetterman, and Thompson 2014). As the University of Michigan Mixed Methods program has been conducting workshops since 2015, a mixed methods evaluation of this program could be informative for a more empirical assessment of skills development.

Mixed methods program and workshops

The University of Michigan Mixed Methods Program (MMP) was established in 2015 as a collaborative effort among faculty, researchers, and staff at the University of Michigan to advance the science of mixed methods research, offer consultations as a service and provide rigorous training in mixed methods research. The latter is the focus of this study. Since its launch in July 2015, the MMP has offered three workshops yearly to promote mixed methods research and scholarship across academic disciplines and train researchers and academics to apply mixed methods to solve compelling research problems. The workshops attract a diverse group of

United States-based and international graduate students, research staff, faculty members and clinicians. Workshops are open to learners in all academic disciplines, as they focus on methodological concepts that unify the learning experience for groups of learners from diverse backgrounds.

Workshops are typically held over 2.5 days, and workshop content includes general mixed methods topics (e.g. designing and conducting a mixed methods research project) and select specialized topics (e.g. writing mixed methods for publication, conducting a mixed methods dissertation or thesis, mixed methods interventions, advances in mixed methods analysis and MAXQDA workshops). Faculty from across campus and outside speakers who have experience conducting mixed methods research provide instruction for a total of twenty-one contact hours per workshop. The program faculty design all workshops to be very applied, drawing from problem-based learning and active learning principles. Learners are advised to come to the workshop with a particular study in mind or in progress and work through key design features. The structure typically consists of short lectures of less than twenty-five minutes with a question and answer period, followed by work time to apply immediately the content learned (table 1). During this work time, learners put ideas to

Table 1: Mixed methods workshop sample agenda – day 1.

7:30–8:00 a.m.	Registration/networking breakfast
8:00–8:15 a.m.	Welcome
8:15–9:30 a.m.	Keynote Address
9:30–9:45 a.m.	Questions and Answers
9:45–11:00 a.m.	Brief Individual Project Presentations (<i>2 min per participant</i>) <ul style="list-style-type: none">• Participants share their name, position, institution, working title for their project, type of project they are working on (e.g. K grant, R grant, dissertation, etc.)
11:00–11:15 a.m.	BREAK
11:15–11:50 p.m.	Presentation 1. Introducing Your Mixed Methods Study <ul style="list-style-type: none">• Worksheet 1: Create an overview and introduction to your project

(Continued)

Table 1: (Continued)

7:30–8:00 a.m.	Registration/networking breakfast
11:50–12:00 p.m.	Questions and Answers
12:00–12:15 a.m.	Worksheet Activities: Complete Activities 1a, 1b, 1c & 1d
12:15–1:15 p.m.	NETWORKING LUNCH
1:15–1:35 p.m.	Presentation 2. Collecting Data for Your Mixed Methods Project
	<ul style="list-style-type: none"> Worksheet 2: Identify our qualitative and quantitative data sources
1:35–1:45 a.m.	Questions and Answers
1:45:00 p.m.	Worksheet Activities: Complete Activity 2
2:00–2:20 p.m.	Presentation 3. Applying Basic and Advanced Designs
	<ul style="list-style-type: none"> Worksheet 3: Identify the mixed methods design that best fits your project
2:20–2:30 p.m.	Questions and Answers
2:30–2:45 p.m.	Worksheet Activities: Complete Activity 3
2:45–3:00 p.m.	BREAK
3:00–3:35 p.m.	Presentation 4. Drawing Mixed Methods Research Designs
	<ul style="list-style-type: none"> Worksheet 4: Draw a diagram of your design procedures
3:35–3:45 p.m.	Questions and Answers
3:45–4:00 p.m.	Worksheet Activities: Complete Activity 4
4:00–5:00 p.m.	Group Project Consultations Session 1

paper by applying the concept to their project using worksheets that workshop faculty provide. For example, after a lecture on mixed methods designs, participants then draw a procedural diagram of their mixed methods design to depict the flow of procedures. Learners then receive feedback from peers and faculty who circulate during work time. The workshop also includes small groups that are faculty-led consultations of four to five learners used to debrief material and review participants' progress on their projects. The faculty consultations also yield important formative assessment evidence that is used to refine the workshop. For instance, if learners' designs do not seem consistent with the intent of the study, that concept may be revisited in a dedicated recap session held at the start of the next

day. On the final day of the workshop, a “poster session” is held. Participants post their completed worksheets and orally present the work they accomplished during the workshop for an additional opportunity to receive feedback from faculty and workshop participants. The poster session is a learning activity meant to mimic a poster session at an academic conference. Moreover, it addresses the skill of critiquing mixed methods research by providing methodological feedback to others. Since the onset of the global COVID-19 pandemic in March 2020, the workshops have been held online via Zoom video conferencing services. The interactive workshop structure has been maintained by utilizing features such as chat boxes and breakout rooms for group discussions and consultations.

The training generally follows Creswell and Plano Clark’s (2017) characteristics and principles for designing mixed methods research, supplemented with original ideas from program faculty contributing to advances in the mixed methods field. Learning objectives include 1) writing a purpose statement, aim or research questions that can be addressed through mixed methods, 2) identifying data sources, 3) selecting and drawing a design, 4) determining strategies for integrating qualitative and quantitative research through the project, 5) identifying threats to validity and 6) writing for publication. Objectives for specialized topics are tailored, such as writing a thesis or dissertation.

Since the program’s inception, workshop material, staff, and ideas have expanded to other sites beyond Michigan within the United States (Stanford University) and abroad (Japan, Qatar). The workshops have formed the basis of a full-length workbook designed for use in mixed methods research workshops, for supporting graduate students working on mixed methods projects, and experienced researchers seeking applied guidance for specific topics (Fetters 2020).

The purpose of this convergent mixed methods research study was to comprehensively assess mixed methods skills development among participants who attended five mixed methods workshops conducted over two years by the MMP. The research questions that guided the quantitative strand were 1) what mixed methods knowledge and skills did participants gain in the workshops? 2) what scholarly output related to mixed methods research did participants produce after attending the workshops? 3) What have participants done to continue engaging in mixed methods scholarship after attending the workshops? The qualitative strand was conducted to provide context for *why* workshop participation did or did not result in mixed methods skill building, specifically focusing on participants’ 1) reasons for attending the MMP workshops and 2) workshop experiences that they

perceived to be helpful in building mixed methods skills. Based on our findings, we present recommendations for course topics and activities to incorporate in mixed methods courses to effectively facilitate skill-building.

Methods

Sample

Participation in the workshops is open to researchers, faculty, staff and graduate students working on a mixed methods proposal, research study or manuscript when they attend the workshop. Workshops are advertised broadly to potential participants from all disciplines at any stage of their research process. They are marketed to members of the University of Michigan, other institutions across the United States, and a global audience via promotional mailings, flyers, and social media. For this study, from 17 October 2017 to 31 October 2017, we surveyed individuals who had enrolled in the five workshops that took place between Spring 2016 and Summer 2017 ($n = 132$). We chose to survey these groups because adequate time had passed since the participants' attendance to reflect on the skills they developed and how they were able to apply what they learned beyond the classroom in their own scholarly work. Study procedures were reviewed by the (name redacted) Institutional Review Board and deemed exempt from ongoing IRB review as educational research.

Data collection

The long-term follow-up survey utilized an intramethod data collection approach (Fetters 2020, 57), in which quantitative and qualitative data collection occurred concurrently in a single survey requesting both closed-ended and open-ended responses (Creswell and Hirose 2019). The survey included a quantitative assessment of learners' engagement in mixed methods research and scholarly output since attending MMP workshops, a quantitative self-rated mixed methods knowledge and skills assessment, and open-ended workshop evaluation questions (appendix 1). We used a self-rating assessment to evaluate mixed methods skills rather than analysing the work participants completed during the workshops (i.e. completed worksheets) because participants fill out worksheets with information about their ongoing or conceptualized original projects, and we felt it would not be appropriate to have participants hand in their intellectual property. Open-ended questions were asked to gather participant reflections of the workshop, namely how beneficial it was to attend

the workshop at their particular research phase, their motivation for attending and helpful aspects of the workshop. General feedback was also elicited for future improvements to workshops.

Pre-workshop assessment data were also used to investigate improvement in mixed methods skills from before and after attending the workshops. Pre-workshop assessment is now standard practice in the MMP; however, because the pre-workshop assessment was only recently incorporated into the workshop administration protocol, follow-up self-assessment item means were compared with pre-workshop skills assessment data collected for participants who attended Fall 2017 and Spring 2018 workshops ($n = 52$). These pre-assessment surveys were distributed to workshop participants roughly one month prior to their workshop attendance and consisted of the same quantitative self-assessment items as the long-term follow-up survey. While the pre-workshop and follow-up skills assessment data were collected from different groups, we believe a true pre-post-test would likely reveal similar data. This is because, for each group of participants at the different workshops, pre-workshop skills assessment data reveal similar skill levels across the different participant groups.

Data analysis

Quantitative data and qualitative data were analysed separately and results were later integrated by merging (description of integration to follow). Data analysis consisted of descriptive statistics, mean comparisons of follow-up self-assessment data with pre-workshop assessment data and thematic text analysis of open-ended responses. We conducted descriptive statistics and mean comparisons (t tests) in SPSS version 24 and text analysis of qualitative data using MAXQDA18. Open-ended data were analysed using qualitative thematic text analysis that consists of reading the data, applying codes and identifying themes (Kuckartz 2014). First, transcripts of participant responses to open-ended survey questions were imported into MAXQDA18, and analysis began with a review of the imported transcripts. Next, two research staff (initials redacted) independently coded data. Research staff met to compare codes and discrepancies were discussed. Based on discussions, similar codes were collapsed and another researcher (initials redacted) was consulted to further refine codes and their definitions where necessary. Codes were then grouped into themes.

Mixed data integration by merging

Results from the separate quantitative and qualitative data analyses were merged using joint display to compare findings (Haynes-Brown and

Fetters 2021; Fetters and Guetterman 2021; Guetterman and Fetters in press; Fetters 2020; Creswell 2014). Joint displays represent a method of integration, in which the qualitative and quantitative approaches are brought together through visual means, allowing for new insights to be drawn out of the integrated dataset (Guetterman, Fetters, and Creswell 2015). Since we conducted the qualitative strand with the intent to provide context for mixed methods skill-building, our goal of merging results was to examine the extent to which qualitative data expanded on, or confirmed quantitative results. We chose to present the bulk of the qualitative analysis results in a separate narrative form, as these findings were most meaningful in informing mixed methods training approaches, and thus warrant a more in-depth presentation and discussion.

Results

A total of one hundred thirty-two participants attended five different mixed methods workshops conducted between Spring 2016 and Summer 2017. Of these, five participants attended two workshops. The survey was sent to one hundred twenty-seven participants, and forty-two completed the survey with a response rate of 33.1 per cent. Fourteen single-spaced pages of responses to four open-ended questions were received for analysis.

Participants

Twenty-one of the survey participants were faculty, researchers or staff. Twenty-one were graduate students, one of which was a medical student. Participants were from a variety of disciplines, including sixteen (38.1%) in health sciences, thirteen (31.0%) in education, seven (16.7%) in nursing, two (4.8%) in psychology and one (2.4%) each in business, library sciences, social and economic studies and social work. Only sixteen (38.1%) participants indicated that there were efforts at their home institutions supporting the dissemination of mixed methods research, including courses, seminar series, workshops and mentoring programs. The remaining twenty-six (61.9%) either did not indicate that their home institutions had efforts to disseminate mixed methods research (blank responses), or stated that there were none. Most participants attended the workshops during the research planning stage. At the time of workshop attendance, thirteen (31.0%) participants reported they were preparing their dissertation or thesis proposal, ten (23.8%) were developing a grant idea or preparing a grant proposal and six (14.3%) reported they were developing their research design. Two (4.8%) participants reported being between designing

a dissertation/thesis proposal and data collection. Fewer participants were in the later stages of the research process during the time they attended the workshops, with only seven (16.7%) participants reporting they were in the data collection, analysis or writing stages. Four (9.5%) participants reported they were in multiple stages spanning the entire research process, from proposal and design development to writing. See table 2 for a summary of participant characteristics.

Table 2: Participant characteristics ($n = 42$).

Discipline	Workshop attended		
Health sciences	16	Designing a Mixed Methods	6
Education	(38.1%)	Project: An Interactive- Participatory Workshop (Spring 2016)	(14.3%)
Nursing	7	Writing Your Mixed Methods	1 (2.4%)
Psychology	(16.7%)	Research for Publication (Summer 2016)	
Business	2 (4.8%)		
Library sciences	1 (2.4%)	Designing a Mixed Methods	8
	1 (2.4%)	Research Project: An Interactive- Participatory Workshop (Fall 2016)	(19.0%)
Social and economic studies	1 (2.4%)	Designing Participatory Mixed	7
Social work	1 (2.4%)	Methods Research: Community- Engaged Approaches to Address Complex Problems (Spring 2017)	(16.7%)
Researcher status	21	Summer Bootcamp for your	19
Faculty/researcher/ staff	(50.0%)	Mixed Methods Dissertation or Thesis (Summer 2017)	(45.2%)
Graduate student/ medical student	21	Attended two or more	1 (2.4%)
	(50.0%)	workshops	
Mixed methods resources at home institutions		Mixed methods project implementation stage at the time of workshop attendance	
None/no indication	26	Dissertation or thesis proposal preparation*	13
	(61.9%)		(31.0%)
Mixed methods courses	5	Grant idea development or proposal preparation**	10
	(11.9%)		(23.8%)
Seminar series	4 (9.5%)	Research design development	6
			(14.3%)

(Continued)

Table 2: (Continued)

Discipline	Workshop attended		
Workshops/ conferences	3 (7.1%)	Between dissertation/ thesis proposal and data collection	2 (4.8%)
Mentoring programs	1 (2.4%)	Data collection	3 (7.1%)
Others:Research consortium, MM faculty, library resources	3 (7.1%)	Data analysis and/or research paper, dissertation or thesis writing	4 (9.5%)
		Multiple stages across the entire research process	4 (9.5%)

*Participants who reported they were in the dissertation/thesis preparation stage *and* research design development stage are included in this count, rather than in the research design development stage count.

**Participants who reported they were in the grant idea development and/or proposal preparation *and* research design development stage are included in this count, rather than in the research design development stage count.

Workshop outcomes

Mixed methods knowledge and skills

Self-assessment ratings of mixed methods knowledge and skills were made on a Likert scale with the following range: 0 = "None", 1 = "Converse about the concept/skill in general ways", 2 = "Give explanations about the concept/skill", 3 = "Apply the concept/skill to challenging research problems" and 4 = "Give expert advice". Independent sample *t* tests of the self-assessment rating means revealed that the post-workshop group had significantly higher self-assessment ratings for nearly all knowledge and skills items compared to the pre-workshop group. The only skills assessment item that showed no significant difference in pre- and post-workshop ratings was the "conducting rigorous quantitative research" item. Participants endorsed their knowledge and skills gained in open-ended responses. Knowledge and skills gained in planning and designing a mixed methods study was most frequently mentioned by participants. Other comments included knowledge and skills gained in mixed methods data collection and analysis, disseminating mixed methods results, and learning mixed methods language. Illustrative quotes and self-assessment data are presented side-by-side in a joint display to demonstrate confirmatory findings (table 3).

Table 3: Comparison of self-assessment score means for participants before and after attending workshops.

Quantitative items	Pre-workshop		Skills at follow-up		<i>t</i>	Qualitative comments	Meta-inferences
	skills	M (SD)	M (SD)				
Mixed methods knowledge							
The foundations of research	1.87 (1.06)	2.61 (0.89)	2.61 (0.89)	-3.51*	"The workshop was extremely beneficial in expanding my knowledge regarding mixed methods"	Qual and quan findings are congruent	
Philosophical stances that guide research	1.48 (0.98)	2.24 (0.99)	2.24 (0.99)	-3.61*	"It was beneficial to understand the implementation of mixed methods in data analysis and research design"	Participants gained knowledge about key mixed methods concepts such as the added value of using a mixed methods approach, integration in mixed methods research designs, and terminology to facilitate mixing the two data types in their projects	
Legitimation/validation strategies	1.20 (1.00)	2.02 (0.99)	2.02 (0.99)	-3.88*	"I knew that I was using two different methods, but I had neither the language nor the tools to combine them. The workshop provided both."		
Rationale for mixed methods	1.57 (0.91)	2.90 (0.66)	2.90 (0.66)	-7.89*			
Mixed methods designs	1.28 (0.98)	2.78 (0.76)	2.78 (0.76)	-8.01*			
Mixed methods research questions	1.24 (1.02)	2.83 (0.77)	2.83 (0.77)	-8.28*			
Mixed methods terminology	1.20 (0.86)	2.78 (0.76)	2.78 (0.76)	-9.07*			
Value added by mixed methods research	1.67 (0.97)	2.90 (0.66)	2.90 (0.66)	-6.97*			

Mixed methods skills						
Planning a mixed methods research study						
Planning a mixed methods study	1.28 (0.98)	2.90 (0.81)	-8.37*	"without the workshop, I would not be able to develop a cohesive mixed-methods plan."	Qual and quan findings are congruent	
Collaborating with others to conduct a study	1.96 (1.13)	2.75 (0.78)	-3.83*	"The workshop was beneficial in providing me the foundation skills and practice to justify the need for mixed-methods in a PhD training program that has not had that type of dissertation previously."	Participants gained skills in identifying the purpose of using mixed methods to address their research questions and plan their study accordingly	
Identifying the purpose for using mixed methods	1.98 (1.00)	3.05 (0.68)	-5.88*			
Writing mixed methods research questions	1.22 (1.05)	2.80 (0.72)	-8.21*			
Designing a mixed methods research study						
Adapting a mixed methods design to a particular research purpose	1.37 (1.08)	2.88 (0.72)	-7.67*	"it helped me to synthesize my ideas for grant proposal in a way that was logical and compelling to integrate qual and quan methodologies"	Qual and quan findings are congruent	
Identifying the rationale for methodological decisions	1.35 (1.02)	2.88 (0.72)	-8.11*		Participants gained skills to conduct studies that intentionally combine the two data types	

(Continued)

Table 3: (Continued)

Quantitative items	Pre-workshop skills M (SD)	Skills at follow-up M (SD)	<i>t</i>	Qualitative comments	Meta-inferences
Conducting integrated data collection and analysis					
Deciding what to mix in a study	1.07 (0.93)	2.63 (0.84)	-8.13*	"Data collection strategy is enhanced so that interaction between QUAN and QUAL strands are amplified."	Qual and quan findings are congruent
Integrating between paradigms	0.98 (0.94)	2.05 (0.93)	-5.27*	"I could develop the diagram of my design and describe the methods of integration that I was going to use for the project."	Participants gained skills to conduct data collection that would facilitate integration and the ability to describe their integration strategies
Integrating qual and quan data	1.22 (1.02)	2.50 (0.72)	-6.61*		

Representing mixed methods findings and publishing mixed methods articles

Developing a joint display to represent the integration of quan and qual data	0.76 (0.88)	2.53 (0.85)	-9.40*	"The workshop provided plenty of insights into ways of presenting my research papers and results in papers and dissertations"	Qual and quan findings are congruent
Writing a narrative to represent the integration of quan and qual data	0.89 (1.01)	2.30 (0.91)	-6.75*	"Ideas for presenting my research methodology and results in papers and dissertations, as well as finding opportunities to publish."	Participants gained skills to represent and report their integrated data analysis results through visual joint displays and in narrative form
Making inferences linking qual and quan data	1.04 (0.92)	2.30 (0.88)	-6.45*		
Disseminating a mixed methods study	0.96 (1.03)	2.28 (0.88)	-6.33*		
Writing about mixed methods conceptually	0.98 (1.00)	2.38 (0.91)	-6.74*		

(Continued)

Table 3: (Continued)

Quantitative items	Pre-workshop skills M (SD)	Skills at follow-up M (SD)	<i>t</i>	Qualitative comments	Meta-inferences
Critiquing mixed methods research and adapting the methodology to certain fields					
Assessing the quality of mixed methods studies	1.00 (0.94)	2.40 (0.93)	-6.92*		N/A
Adapting mixed methods to a sociocultural context	1.00 (1.10)	2.13 (0.94)	-5.07*		
Adapting mixed methods to a discipline	1.09 (0.97)	2.26 (0.88)	-5.73*		

Note. * $p < .001$.

Score range:

Mixed Methods Knowledge: None = 0, Converse about the concept in general ways=1, Give explanations about the concept=2, Apply the concept to challenging research problems=3, Give expert advice=4

Mixed Methods Skills: None=0, Converse about the skill in general ways=1, Give explanations about the skill=2, Apply skill to challenging research problems=3, Give expert advice=4

Scholarly outcomes

There were forty-one valid responses about scholarly outcomes. Of these, seven (17.1%) participants reported they published peer-reviewed articles focused on mixed methods, and seven (17.1%) participants reported they received funding for projects focused on mixed methods since attending workshops. Some participants attributed having received favourable grant reviews to workshop participation. One participant noted "I was working on an R21 grant proposal, and it was my first time developing a mixed method study... I was able to use some of the example language and figures to present the mixed method approach in my Approach section. Our proposal was reviewed and scored well. The reviewers were positive about our mixed method approach". Another participant reported, "prior to this, I had no knowledge of mixed methods and after the workshop, I was able to write my mixed methods aim and the review indicated it was very well planned and written". Further, since attending the workshop, sixteen (39.0%) participants reported they prepared a manuscript for publication focused on mixed methods, and twenty-four (58.5%) participants reported they prepared a grant proposal for conducting a mixed methods study. Twelve (29.3%) participants reported they submitted a manuscript for publication focused on mixed methods, and nineteen (46.3%) participants reported they submitted a grant proposal for conducting a mixed methods study.

Continued engagement in mixed methods scholarship

There were forty-one valid responses about continued engagement in mixed methods scholarship. Few participants reported taking a mixed methods research course ($n = 5$, 12.2%) since attending mixed methods workshops. More participants reported taking a qualitative or quantitative research course after the workshops ($n = 14$, 34.1%; $n = 13$, 31.7%, respectively). However, many participants reported they remained engaged in mixed methods research activities in a self-directed manner. Most participants reported they read a mixed methods book ($n = 33$, 80.5%), several reported reading mixed methods literature on a weekly basis ($n = 14$, 34.1%) and a few even reported they attended a mixed methods conference ($n = 4$, 9.8%). Most participants also reported they engaged in a mixed methods research project in some capacity since attending workshops. Twenty-two participants (53.7%) reported seeking out a mentor, thirty-seven (90.2%) worked on a mixed methods project, twenty-three (56.1%) worked on a mixed methods research team, thirteen

(31.7%) consulted on a mixed methods study and five (12.2%) mentored a mixed methods study. Three participants (7.3%) even reported teaching a mixed methods course since attending workshops.

Reasons for attending workshops

Among participants whose home institutions lacked efforts to disseminate mixed methods research, six participants (14.3%) cited their lack of access to mixed methods resources as their motivation to attend the workshops. Of these participants, three of them reported they were conducting a mixed methods dissertation despite lacking mixed methods research courses and mixed methods support from their department/dissertation committee. Aside from a lack of access to mixed methods resources, participants' motivation to attend the workshops did not differ significantly between those whose home institutions lacked efforts to disseminate mixed methods research and those who reported they did have access to mixed methods resources. Across both of these groups, participants were motivated to attend the workshops 1) to learn more about mixed methods research, including specific mixed methods topics such as integration and mixed methods designs, 2) to learn directly from experts in the mixed methods field and 3) to receive support in understanding collected data, refining designs and advancing projects that were initiated before coming to the workshops. Only those who reported having access to mixed methods resources noted they were motivated to attend the workshops to gain exposure to current advances and state-of-the-art mixed methods procedures.

Workshop experiences

We identified four themes that expanded upon the scaled items and provided information about participant experiences at the workshops that helped them achieve scholarly outcomes and develop knowledge and skills (table 4).

“Hands-on approach to learning the material”

Many participants felt that the workshop flow, with lectures followed by hands-on work time, was an effective approach to learning mixed methods research. Specifically, participants liked that the hands-on approach allowed for practical application of the learned concepts to their projects. This included all hands-on activities during the workshop, including the worksheets, poster session activity and consultation sessions.

Table 4: Helpful workshop experiences.

Themes and sub-codes	Description	Illustrative quotes
<p><i>"Hands-on approach to learning the material"</i></p> <ul style="list-style-type: none"> - Workshop activities - Practical application 	<p>Hands-on, participatory format of the workshop was an effective method of learning</p>	<p>"I found the format of presentations followed by work time to be extremely effective"</p> <p>"I liked the use of the worksheet because this made it practical and allowed each scholar to leave with tangible work on their research"</p>
<p><i>Value of expert and peer feedback</i></p> <ul style="list-style-type: none"> - Expert consultations - One-on-one mentoring - Interactive nature of workshop - Networking needs 	<p>Expert and peer feedback were valuable, but individual mentoring and structured networking opportunities are needed</p>	<p>"I think that being able to sit and talk through my idea with various veteran mixed methods scholars was the most helpful part"</p> <p>"would have liked more time with a mentor (individual instead of small group)"</p> <p>"I would have benefitted from more structured networking opportunities, and ways of quickly identifying others with similar research interests"</p>
<p><i>Mixed methods topics</i></p> <ul style="list-style-type: none"> - Helpful workshop topics - Workshop topic needs 	<p>Several mixed methods topics covered in the workshops were identified as helpful by participants, and other workshop topic needs were identified</p>	<p>"Some of the presentations like conceptual framework and building an instrument was particularly useful to me"</p> <p>"I would have liked to cover some more advanced topics in more detail, in particular complex designs"</p>
<p><i>Optimal timing to attend workshops</i></p>	<p>Workshops were still helpful even if attendance timing did not align with research implementation stage</p>	<p>"Definitely helpful for framing the work we were doing in the larger context of MMR, but it would have been more helpful had I had more of the manuscript already prepared."</p>

Value of expert and peer feedback

Several participants reported that receiving expert and peer feedback was a valuable aspect of the workshops. Further, participants reported discussions that emerged from recurring opportunities to interact with other workshop participants and faculty circulating the room helped refine their projects. These comments pertained to peers in their small consultation groups who were grouped by similar research topics, and interactions with peers from different disciplines during the poster session. That said, some participants felt they would have benefited from formal one-on-one mentoring opportunities with mixed methods experts. Other participants lamented that networking opportunities were insufficient and suggested having more structure to facilitate easier interaction among participants with similar research projects or scholarly backgrounds.

Helpful workshop topics and topic needs

Workshop participants identified a variety of mixed methods topics covered in the workshops that were helpful to them. Learning about ways to visually represent the research process, analysis and findings, including procedural diagrams, implementation matrices, conceptual frameworks and joint displays, were frequently mentioned as helpful topics. Participants also expressed a desire to learn about integration of data types, mixed methods research questions, how to build an instrument in a mixed methods study, core designs and mixed methods grant writing.

Optimal timing to attend the workshop

MMP workshop participants bring different skills to the workshops based on their diverse backgrounds and attend during different stages of their project implementation process. As such, there was variability in opinions on the ideal timing to attend workshops. For example, one participant noted "attending during the design phase allowed me to start off on the right foot", while another participant who reported attending the workshop during their dissertation or thesis proposal preparation stage commented, "I do wish I would have had SOME data to use". However, overall, the participants found the workshops helpful even if attendance timing did not align perfectly with their research implementation stage.

Discussion

The data illustrate that a well-orchestrated mixed methods research workshop conducted over a 2.5-day period can contribute meaningfully to a

wide range of mixed methods research skills development. Additionally, these findings suggest that even if participants come into a mixed methods workshop at varying stages of the research process, a sufficient breadth and depth of content can help ensure that the training material is relevant to individual participants' projects. These findings further suggest that participants of diverse academic backgrounds can come together in a methodology focused workshop regardless of specific content. While groupings according to content interest is one category for creating small groups, similar content interest does not appear to be a prerequisite to meaningful interaction, learning, and skills development. Given the slow-paced academic clock when submission and review of papers and grants can be measured in years, the time from participation in the workshop to the time of survey distribution was relatively short. Nonetheless, a number of participants noted specific benefits for the submission of mixed methods research papers and proposals.

We employed a convergent mixed methods design for this study, in which the quantitative and qualitative components of the survey were independently analysed and then merged to create a framework for understanding mixed methods research skill-building (Tashakkori and Teddlie 2008). Quantitative data revealed that workshop attendance has resulted in research knowledge and skill-building for participants, evidenced by an improvement in self-reported mixed methods research skills and publication of peer-reviewed mixed methods papers and successful grant applications. Qualitative comments confirmed these findings in some instances and expanded upon the findings by revealing experiences that were helpful in developing research skills, thus providing insight into the teaching of mixed methods.

Findings from our study are consistent with the reported trend in the adoption of mixed methods research – interest is high among learners across diverse disciplines. In our sample, quality training opportunities were well sourced in some institutions and scarce in others. For those who had access to mixed methods resources at their home institutions, participation in MMP workshops to receive further project guidance and to learn about advances in mixed methods research suggests that access to some existing resources alone may not suffice. While we cannot comment on the quality of the resources to which some of our participants had access, these findings do affirm the need for more attention to training efforts conducive to mixed methods research skill-building. Further, the participants' high motivation to learn mixed methods research may help explain the positive workshop outcomes. In addition to personal

skill and quality instruction, motivation plays a crucial role in learning (Wlodkowski 2017).

As to study limitations, first, our follow-up survey response rate was lower than desired. Despite our small sample size, we were able to gather data rich enough to evaluate the program. This work is important because it models a methodology for evaluating skill-building efforts. Second, the pre- and post-workshop skills assessment data were collected from different groups. As discussed, the probability of a true pre-post-test altering our results is unlikely considering participants often have comparable skill levels in mixed methods research before attending the workshops. Third, we cannot conclude that some of the scholarly outcomes reported were solely attributable to workshop participation because we did not have a control group to compare outcomes. However, inclusion of open-ended responses helped connect workshop outcomes to workshop participation in some instances. Lastly, collecting qualitative data through surveys is not as rich as other approaches such as interviews. However, surveys did allow us to reach a larger proportion of our attendees than would have been possible through interviews, and although the volume of qualitative data was limited, it served to supplement our understanding of mixed methods skill-building (Fetters 2020, 59).

Implications for teaching mixed methods research

Participants indicated that a key workshop feature in developing mixed methods research skills was the hands-on activities. This finding supports claims that mixed methods learning is best achieved through experiential means (Poeth 2014) and is consistent with recommendations of visible learning (Hattie 2012). As Poeth points out, mixed methods course objectives discussed in the literature mostly focus on planning a study (2014). Instead, incorporating exercises that actively promote the application of what learners are taught enables them to move beyond the "conceptual phase" and gain implementation-oriented skills like integration strategies and skills to enhance dissemination (i.e. "applied phase") (Onwuegbuzie et al. 2013). If learners have a working mixed methods project or are actively planning one, providing worksheets that correspond with learning objectives (as in the MMP) or project development outlines as a research design template (Christ 2009) may be sufficient, as their own projects serve as a tool for learning mixed methods (Guetterman et al. 2018). In fact, since guided worksheet exercises in MMP workshops allow

learners to continue developing their projects after leaving the workshops, these worksheets may have played a part in the continued engagement in mixed methods projects among our sample, further enhancing their skills. However, in learners who have yet to conceptualize a project, research or dissertation proposal development activities (Christ 2009; Poth 2014; Ivankova 2010) may be more appropriate. In addition, protecting time for learners to demonstrate the work they completed (i.e. consultation sessions, poster presentation session) is useful because it keeps them engaged and motivated to fill out worksheets or complete activities, and provides an additional opportunity for learners to receive feedback on their work. Participation in these activities further provides an opportunity to apply learned skills by critiquing others.

Another important feature was the opportunity for peers and mixed methods experts to provide feedback on participant projects throughout the workshop. The MMP is unique in that several faculty members attend workshops (as many as ten for some), which allows for small group consultation sessions. Just as the heterogeneity of learners can be a challenge in the classroom (Christ 2009; Poth 2014), these small groups are difficult to optimize in a workshop setting. However, our findings suggest that the timing of participating in workshops (study planning vs. conducting stage) is not detrimental to participating together in workshops, as participants reported benefitting from attending regardless of the stage of their research process. This may be attributable to the MMP's focus on teaching mixed methods skills in a way that emphasizes the importance of letting qualitative, quantitative, and mixed methods research questions drive the research (Onwuegbuzie et al. 2013). One of the first presentations in the MMP's workshops is a talk that guides participants to think through their rationale for using a mixed methods approach, and an exercise writing out their mixed methods research questions. When questions arise throughout the workshop about choosing mixed methods designs, data collection and analysis procedures and integration strategies, participants are often encouraged to think back to their research questions and what they hope to accomplish by bringing the two types of data together. An emphasis on research questions, and how they relate to the overall design and analysis plan of the study, can help learners think through the complementarity of qualitative and quantitative methods throughout all stages of the research process (Tashakkori and Teddlie 2003), whether they are just getting started or jumping into data analysis. It makes sense then, that learners in our sample found activities for

representing the complex research process using visual means (conceptual frameworks, implementation matrices, joint displays) particularly helpful.

Considering the results of our evaluation and the challenges of teaching mixed methods research, we summarize recommendations for mixed methods teaching:

Recommended teaching approaches:

- Create opportunities for peer-to-peer learning
- Incorporate time for interaction between learners and instructors following lectures (e.g. group consultations, one-on-one mentoring)
- Use written exercises to keep learning relevant to individual studies (e.g. worksheets, activities involving creating a project outline or research proposal)
- Incorporate time for learners to share the work they completed in training to keep learners engaged and provide opportunity to receive and give feedback on projects (e.g. poster session)

Recommended topics to cover:

- Mixed methods language to use when writing about mixed methods designs in proposals, applications and manuscripts
 - Clarifying research questions and rationale for using a mixed methods approach
 - Qualitative and quantitative data collection strategies that will facilitate integration in the analysis stage
 - Strategies for integrating qualitative and quantitative findings
 - Strategies for representing and disseminating mixed methods findings (e.g. joint displays)
-

Although this study only evaluated a series of workshops, there are broader implications for the development of mixed methods courses and other training formats. While interest in mixed methods research continues to grow, quality mixed methods training is still scarce. It is important to ensure that future mixed methods training opportunities are optimized by incorporating evidence-based approaches to facilitate mixed methods skill-building. This work emphasizes the need and opportunity to share strategies for teaching mixed methods research among those engaged in this work.

Appendix 1. Long-term follow-up survey

Section I: Mixed Methods Workshop Follow-up

Instructions:

For this section, please reflect on your experience attending the Michigan Mixed Methods Research & Scholarship Program workshop.

During which stage of the research process did you attend the workshop? Please select all that apply.

- Grant idea concept development
- Grant proposal preparation
- Dissertation or thesis proposal preparation
- Research design development
- Data collection
- Data analysis
- Research paper, dissertation or thesis writing
- Other: _____

Reflecting back, how beneficial was it to attend the workshop at this stage in your research? Please explain in a sentence or two.

What motivated you to attend the workshop?

What did you find most helpful about this workshop?

Please provide any feedback you have about the workshop after reflecting on the experience.

Section II: Professional Experiences

Instructions:

Please mark yes or no for each of the following professional experiences you've taken part in since attending the workshop.

	Yes	No
I took a qualitative research course.	<input type="radio"/>	<input type="radio"/>
I took a quantitative research course.	<input type="radio"/>	<input type="radio"/>
I took a mixed methods research course.	<input type="radio"/>	<input type="radio"/>
I've read a mixed methods book.	<input type="radio"/>	<input type="radio"/>
I attended a mixed methods conference.	<input type="radio"/>	<input type="radio"/>
I worked (currently or past) on a mixed methods project.	<input type="radio"/>	<input type="radio"/>
I am seeking out or have found a mixed methods mentor.	<input type="radio"/>	<input type="radio"/>

I served (currently or past) as a mixed methods mentor.	<input type="radio"/>	<input type="radio"/>
I provided (currently or past) consultation for mixed methods studies.	<input type="radio"/>	<input type="radio"/>
I worked (currently or past) on a mixed methods research team.	<input type="radio"/>	<input type="radio"/>
I taught (currently or past) a mixed methods course.	<input type="radio"/>	<input type="radio"/>
I've been reading mixed methods literature at least weekly.	<input type="radio"/>	<input type="radio"/>

Please indicate the number of qualitative research courses you have taken since attending the workshop.

Please indicate the number of quantitative research courses you have taken since attending the workshop.

Please indicate the number of mixed methods courses you have taken since attending the workshop.

Section III: Mixed Methods Knowledge

Instructions: For the next section, think back to the knowledge you acquired at the mixed methods workshop. Please indicate the extent to which you are **knowledgeable** about each of the following concepts of mixed methods research.

When responding to each item, please consider the areas relative to one another.

Please select only one response column for each area of knowledge.

	None	Converse about the concept in general ways	Give explanations about the concept	Apply the concept to challenging research problems	Give expert advice
The foundations of research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Philosophical stances that guide research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Legitimation/validation strategies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The rationale for mixed methods	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	None	Converse about the concept in general ways	Give explanations about the concept	Apply the concept to challenging research problems	Give expert advice
Mixed methods designs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mixed methods research questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mixed methods terminology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The value added by mixed methods research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section IV: Mixed Methods Skills

Instructions: For the next section, think back to the skills you gained at the mixed methods workshop. Please indicate the extent to which you are **skilled** in each of the following concepts of mixed methods research.

Choose from the following response options by considering what you "can do." When responding to each item, please consider the skills relative to one another.

	None	Converse about the skill in general ways	Give explanations about the skill	Apply skill to challenging research problems	Give expert advice
Assessing the quality of mixed methods studies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Planning a mixed methods study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Collaborating with others to conduct a study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conducting rigorous qualitative research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conducting rigorous quantitative research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	None	Converse about the skill in general ways	Give explanations about the skill	Apply skill to challenging research problems	Give expert advice
Identifying the purpose for using mixed methods	○	○	○	○	○
Adapting a mixed methods design to a particular research purpose	○	○	○	○	○
Writing mixed methods research questions	○	○	○	○	○
Identifying the rationale for methodological decisions (e.g. design, collection, and analysis) in a mixed methods study	○	○	○	○	○
Deciding what to mix in a study	○	○	○	○	○
Integrating between paradigms	○	○	○	○	○
Integrating qualitative and quantitative data	○	○	○	○	○
Developing a joint display to represent the integration of quantitative and qualitative strands	○	○	○	○	○
Writing a narrative to represent the integration of quantitative and qualitative strands	○	○	○	○	○
Making inferences linking qualitative and quantitative data	○	○	○	○	○

	None	Converse about the skill in general ways	Give explanations about the skill	Apply skill to challenging research problems	Give expert advice
Disseminating a mixed methods study	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Writing about mixed methods conceptually	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adapting mixed methods to a sociocultural context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adapting mixed methods to a discipline	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please indicate any efforts at your institution that supports the dissemination of mixed methods research (e.g. training program, mentoring program, courses, etc).

Section V: Mixed Methods Publications and Grants

Instructions: For the next section, please think about your research report and grant proposal writing activities since you attended the workshop.

	Yes	No
I have prepared a manuscript for publication focused on mixed methods.	<input type="radio"/>	<input type="radio"/>
I have submitted a manuscript for publication focused on mixed methods.	<input type="radio"/>	<input type="radio"/>
I have published a peer-reviewed paper focused on mixed methods.	<input type="radio"/>	<input type="radio"/>
I have prepared a grant proposal for conducting a mixed methods study.	<input type="radio"/>	<input type="radio"/>
I have submitted a grant proposal for conducting a mixed methods study.	<input type="radio"/>	<input type="radio"/>
I have received external funding for a mixed methods study.	<input type="radio"/>	<input type="radio"/>

Please indicate the journal(s) that have accepted your mixed methods manuscript for publication.

Please indicate the organization(s) that have accepted your funding proposal for conducting a mixed methods study.

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The Cloak and Dagger: A Mixed Study of Covert Bullying in Jamaican High Schools

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Abstract

Despite its growing prevalence and adverse impact on students' health and social welfare, covert bullying remains one of the most underestimated and under-reported forms of abuse among adolescents. Hence, the purpose of this mixed methods study was to examine the nature and prevalence of covert bullying among adolescents within the context of Jamaican socio-cultural, historical and economic environs. Underlined by the transformational paradigm, an exploratory sequential model was employed. The initial qualitative phase was organized into four case studies to explore the experiences of twenty-seven students attending nine urban high schools. Primary data were collected through semi-structured interviews, focus group discussions, doodling, informal observations, conversations and video viewing, triangulated by secondary interviews with three adolescent experts. A subsequent quantitative survey of 279 students attending seven high schools was conducted. Qualitative findings produced four themes – Bullying Situations; Impact; Coping; and Profiles and Explanations. Quantitative findings revealed high prevalence rates of victimization and perpetration and a moderate relationship between them. The mixed integrated findings confirm that Bullying Situations in school communities are highly facilitated by "popularized" peer group structures that adopt the symbols and norms of the larger society to dictate peer status and differences. Integrated findings also establish that students are "often" excluded or rejected by a peer group that "often" results in outcomes of low self-esteem, depression and/or anxiety. Positive change in the school system will require whole school intervention and socio-cultural reform efforts that harness students' voice and participation. Also critical are the reform of teacher recruitment, training and support and changes to the national curriculum that accentuate anti-bullying policies and aggression.

Keywords: covert bullying; relational aggression; social aggression; school bullying; school violence; peer aggression; adolescence; teacher bullying; mixed methods; exploratory sequential design; culture; transformational; case studies; grounded theory.

Introduction

School violence and *bullying* have always been a universal problem that continues to grow despite the international mandate to uphold children's rights "to be educated in a safe environment, free from all forms of violence, victimization, harassment and neglect" (Cross, et al. 2009 p.12; UN 1991). Arguments presented here include many undetected, unacknowledged *covert* and socio-cultural forms of bullying that incite and buffer the rates of violence in schools and communities and have a sustained negative impact on students' health and welfare that ultimately compromise adolescents' development towards healthy citizenry. This bears implications for the increasing rates of violence and crime in Jamaican schools, despite national efforts to curtail the problem (Holness and Davis 2008; UNESCO 2005), particularly in light of the increasing socio-economic and multiethnic student population who matriculate into high school through national assessments.

The term *covert bullying* was borrowed from Cross et al. (2009 p. 22), who define it as any form of social, relational aggression or indirect aggression, including by means of technology, whereby the bullying behaviour is either unwitnessed, unacknowledged or inadequately addressed by an adult. Bullying is typically a repeated behaviour intended to cause harm and characterized by an imbalance of power, physical or psychological.

International literature also indicates a considerable knowledge gap of *covert bullying* mainly due to "underreporting" and "underestimating" of these forms of aggression. As such, these forms are difficult to detect while arguably, intensifying with the use of technology. Moreover, children commonly exercise a culture of "not telling," promoted by adults' lack of or inadequate responsiveness, often due to lack of necessary intervention skills or the perception that these bullying behaviours are "normal" (Cross et al. 2009; Martocci 2015; Kruger 2011). A review of local literature also shows that more attention has been paid to obvious, *overt* forms of school violence with minimal studies on *bullying* as a topic; hence, the purpose of this study was to gain a comprehensive understanding of the dynamics of covert bullying within the Jamaican socio-cultural, historic and economic environs and establish the scope of those findings. The mixed methods research (MMR) questions that guided the study are as follows:

1. *How do students describe their experiences of covert bullying in high schools?*
2. *What are the prevalence rates of bullying victimization and perpetration?*

3. *How have the qualitative themes and sub-themes (related to bullying situations, impact, coping and profiles and explanations) been confirmed and elaborated on by the quantitative findings and what new insights have been gained?*

Review of the Literature

Conceptualization and Forms

Dan Olweus (2003, 1996) proposes three main features of a bullying action – repeated behaviour, intent to cause harm and a power differential. However, these features often pose conceptual ambiguities among researchers (Seely, et al. 2009; Smith 2004; Hamburger, Basile and Vivolo, 2011). As a consequence, researchers assert that bullying must be defined within its own context and culture (e.g. Rigby 2003). Furthermore, the concepts of “hidden” and “unacknowledgement by adults” in the covert bullying definition, in the introduction to this study, were articulated by the children in Cross, et al.'s (2009) study. I relied on these to help guide this study. Studies also show that children in different countries define bullying differently (Macklem 2012), and children are also more attuned than adults to relational/emotional (Williams 2008) and indirect forms of aggression (e.g. exclusion, isolation, teasing) also identified as bullying (Gropper and Froschl, 2000; Khosropour and Walsh, 2001). Some common forms of indirect and relational aggression mentioned in literature include, but are not limited to, cyber bullying, sexual harassment, social exclusion, gossip, cruel teasing, homophobic bullying and racial/ethnic stereotyping (e.g. Bullock 2002; Smith 2010; Williams 2008; Kruger 2011; Nycyk 2015). Exclusion and rejection are deemed as the most prevalent and impactful forms.

The Peer Group and Profiles

Several characterizations and roles have been identified within the context of a bullying event or circle (Olweus 2003). The three main characters identified are the bully, victim and bystander as well as, the bully-victim. Contrary to former views of a bully having low self-esteem, the “typical” bully is depicted as a self-empowered individual who regards bullying as prosocial aggression to assert dominance (Olweus 1996; Smith and Brain, 2000; Kansas Safe School Resource Centre (KSSRC 2012) and is impulsive and non-empathetic (Khosropour and Walsh 2001). Most propose parenting as authoritarian, hostile, rejective or permissive (Baldry and Farrington, 2000; Batsche and Knoff 1994; Olweus 1996). However, in

Kruger's (2011) recent study, teachers associated "insecurity, low-self-esteem and dominance" with bullying and home, parenting and community (p.114). Even so, Wolke (1999) maintains that "pure" bullies are "healthy" with no victimization (p.3) and "highly popular" (Wolke and Lereya, 2015, p. 879).

Salmivalli's (2010) review of peer groups also assimilates bullies as powerful, and popular even when disliked by classmates, especially among adolescents (p.114) and girls (Salmivalli, Lagerspetz, Björkqvist, Österman and Kaukiainen 1996 p.11). However, Olweus (1996) posits that although the bully has a few peers who like them, popularity is only average to low and declines considerably in later adolescence (up to 16 years old) (p. 17). Researchers also assert that bullying decreases with age (Dake, Price and Telljohan 2003; Batsche and Knoff 1994), yet other researchers argue that covert bullying increases with adolescence (Cross, et al. 2009). This highlights the need for closer investigations of particular forms practised among developing adolescents.

Olweus (1996) places victims into two categories. The passive/submissive victim has negative views of aggression and self, is passive and gives off "insecurity" signals to the aggressor although undeserving and "helpless" (p. 16). Victims are described as quiet, sensitive, cautious, lonely and lack friends (Bullock 2002 p. 2). In addition, they experience anxiety and fear of victimization. Without intervention, they are predisposed to continued depression, low self-esteem and peer rejection (Schwartz, Dodge and Coie, 1994). In contrast, the provocative victim, although anxious, is aggressive, hyperactive and retaliatory (Olweus 1996). However, Rigby (2003) subscribes to the bullying incidence as more "bi-relational" and reciprocal and posits that high or low self-esteem does not necessarily make a difference in initiating bullying actions although low self-esteem might make the bullying impact seem more intense and further perpetuate the cycle.

The idea of *difference* is part of victimization in studies and is often used in students' repertoires of bullying targets (e.g. Khosropour and Walsh, 2001). Being different in Williams's (2008) study with college freshmen who share on their K-12 years connoted weight, size, clothing, race, exceptionality, special education, being smart, real or perceived sexual preference, another accent or ethnicity or just being different. Terasahjo and Salmivalli's (2003) interviews with 74 Finnish students revealed that students' bullying repertoires, especially of "odd" (different) and "deserving" victims (p. 146), had underestimation constructs and are both manifestations of peer relations and discourses that are continually taking place in the classroom and larger societal culture. Furthermore, "bullying

can be construed as unproblematic and justified" (Terasahjo and Salmivalli 2003 p. 134). This position echoes similar sentiments of Meyer (cited in Miller, Burns and Johnson's, 2013 book, "Generation Bullied 2"), who ties bullying to socio-cultural norms, and Phoenix (1998), who further contends that difference dictates societal relations. Olweus (1996 p.17), however, challenges these positions and maintains that bullying is the outcome of individual pathologies and contextual factors such as a bully's need for power and dominance and parenting style and victim's response patterns; not factors such as class size, academic prowess or externals such as overweight, red-hair, glasses, accent, dress code or even low self-esteem or insecurity (Olweus 2003).

The bystander's role has also become important in peer victimization and support (Mishna 2008; Hawkins, Peplar and Craig 2001). Hanish, Ryan, Martin and Fabes (2005) posit that, while some bystanders remain passive, others are also victimizers who encourage the bullies, possibly to establish social dominance, group cohesion and homogeneity. Bystanders may also experience elevated emotions and Olweus's "contagion effect" (joining in) especially if they respect the bully (Peplar and Craig, 1995). Nonetheless, KSSRC (2012) reports that bystanders often have emotions of anxiety, fear, guilt and helplessness. In effect, Poyhonen et al.'s. (2012) study showed that a bystander's decision to help the victim, stay passive or support the bully will be influenced by how they perceive the outcome (consequences) and merit of that outcome (e.g. Will I feel better if I do the right thing?). Thus, if conflicted, bystanders will likely remain passive.

Impact and Explanations

The Australian Covert Bullying Prevalence Study (Cross, et al., 2009) reports that covert bullying is possibly one of the most "underreported" of all abuses; hence, knowledge gaps exist to determine true prevalence and impact. Nevertheless, children's reports have shown that they feel greater victimization from covert rather than overt forms (Cross, et al. 2009; Williams 2008). Seemingly "less serious" and indirect bullying can result in greater psychosocial impact than overt forms (Cross et al., 2009; Kruger 2011), sometimes with tragic outcomes such as suicide (Thomas, 2010) or killings (Klein 2012; Martocci, 2015). Covert bullying has, no doubt, been contained somewhat and warrants more studies that will reveal its true nature and impact.

Psychological outcomes include low self-esteem, depression and suicidal ideation, especially among adolescents (Thomas 2010).

Spears, et al.'s (2008) cyber bullying study also provides a list of victim emotions that include anger, aggression, sadness and depression, loneliness, rejection, exclusion, isolation, avoidance, fear and anxiety. Smith's (2010) cyber study of Caymanian students included difficulty sleeping and concentrating. Victimization might also incur poor social and communication skills, friendship issues and anti-social behaviours or result in changing schools or location, absenteeism, truancy and poor academic performance (Batsche and Knoff 1994; Dunne, et al. 2010; Seely, et al. 2009).

Bullying is commonly explained in international literature as a systemic problem (Rigby 2003) with a combination of eco-environmental factors such as family, peer groups, school and community as extensions of the individual (e.g. Craig and Peplar, 2003; McGuckin and Minton, 2014; Kruger 2011, Olweus 2001). A local study, however, found that family/home and parenting play a larger role in influencing bullying actions (Meeks Gardner, Powell and Grantham-McGregor 2007). Another position is that bullying is a social problem that is promoted by negative perceptions of the school environment such as the quality of teacher-student relationships (e.g. Olweus and Limber 2010) or the lack of collective efficacy such as trust and cohesion (Williams and Guerra, 2011). Local researchers, Lambert, et al. (2008) and Thompson (2009), also agree that the teacher-centred culture and lack of respect of students promote the bullying, while Harris (2009) posits that, teachers who are warm-natured and encourage inclusion in class experience less bullying among their students. Salmivalli (2010) also refers to class norms as one factor that can intensify the "hurtful" bullying on victims (p.113). Thomas (2010), however, speaks to the societal issues that promote differentiation within the Jamaican school context. Thomas explains that there are three overlapping and overarching societal /ecological systems – family, educational and economic – that incur insensitivities and risk factors and create differentiation (e.g. social status and purchasing power) among students. As a consequence, students' vulnerability to aggression, low self-esteem, negative self-concepts, suicidal ideation, antisocial behaviours and violence is increased. To extend that argument, Lareau's (1992, p. 4) study of mixed social classes in school espoused the role of "cultural capital" (from¹ Bourdieu's article, What makes a Social Class?) as "widely shared high status cultural signals (attitudes, preferences, formal knowledge,

¹Bourdieu, Pierre (1987). "What Makes a Social Class? On the Theoretical and Practical Existence of Groups." *Berkeley Journal of Sociology* 32, 1-17.

behaviors, goods and credentials) used..." in establishing "social inequality" (Lareau 1992; Lamont and Lareau, 1988).

In more recent shifts, researchers (e.g. Reid, Monsen and Rivers 2004; Williams 2008) including covert bullying researchers, Cross, et al., (2009), place great importance on peer group dynamics. Researchers argue that bullying is situational and relational and within the peer group, cultural and social processes underlie power relations (not aggression or power differentials) and create a context for bullying (Kruger 2011). As such, Horton (2011 p. 270) points out examples of social, manipulative skills such as "assertiveness" and "verbal dexterity" that likely establish status in relations. Nycyk (2015) elaborates that people use power in "social situations to control outcomes... through the use of language to cause the inequality and marginalization of others" (p.18). This group approach focuses more on the diversity and social interaction of role players in the "collective" process of group inclusion and exclusion (Horton 2011 p.269) and their motivations, attitudes and emotions (e.g. Salmivalli 2010). Based on their qualitative study on Harassment in Student Groups, Terashjo and Salmivalli (2003) add that bullying is indeed a group phenomenon, a construct of not only whole school and class interactions but also a reflection of the larger discursive socio-cultural norms and media. With the knowledge gap of covert forms and group processes, these new insights into group norms and power relations clearly warrant research.

Coping and Mitigation

Student explanations (vignettes) of "what factors promote or prevent bullying" (Ttofi, Baldry and Farrington 2008, p. 74) are lacking in the literature (Salmivalli 2010; Baldry and Farrington, 2000). As such, a few studies show that boys and girls favour peer friendships for coping support, especially boys (e.g. Bowles and Lesperance 2004). In contrast to girls, absenteeism is also reduced with boys who sustain emotional impact and maintain friendships (Dunne et al.'s 2010). Other researchers found that friends and bystanders, more so than family, reduce the likelihood of being bullied and improve academic achievement (Rothon, Head, Klineberg and Stansfeld 2011). Although, Lagerspetz, Björkqvist and Peltonen (1988) and Terashjo and Salmivalli (2003) contend from their findings that friendships can also facilitate more indirect social aggression and rejection while. On another note, Seeley, et al.'s (2009) study offers school work that is engaging as a way to mitigate bullying. Nonetheless, peer support and mediation, especially among adolescent

girls, hold great promise for school-based intervention (e.g. Bullock 2002). In support, Cowie, Naylor, Talamelli Chauhan and Smith's (2002) study showed that despite the "macho" (boys showing empathy) issues that arise (Smith and Brain 2000), peer support and mediation are effective.

The literature reveals that researchers are still grappling with intervention efforts and more evidence-based research is needed to establish success (e.g. Baldry and Farrington 2000). Some success has been reported with school-based programmes especially those that follow Olweus's programme (Ttofi, et al. 2008). Olweus's intervention focused on the individual, improvement of school context and peer support and showed an outcome of up to 50% reduction in bullying activity (Olweus 2003). On the other hand, researchers that examine group processes and norms maintain the need for intervention at the peer group level (e.g. Salmivalli 2010; Craig and Peplar 1995, 2001; Baldry and Farrington 2000). This is, despite the lack of "insight into what in the group level should be changed and how" such as how members are selected and socialized (Salmivalli 2010, p. 117). Salmivalli even suggests training students to reduce the power-seeking status of the group leader (bully). Nevertheless, the more preferred approach is a whole-school (ecological) intervention that considers the individual, peer, family, school and community, some with different emphasis (Swearer, Espelage, Vaillancourt and Hymel's 2010; Bullock 2002, Kruger 2011). The literature also reveals that the more effective of these pursue intervention to the national level to gain the support they need (McGuckin and Minton 2014; Smith and Brain 2000).

The Theoretical Framework

The research involved a deductive-inductive and iterative data collection process that called for Blumer's (1969) assumptions of *symbolic interactionism*; Gruenewald's (2003) *critical pedagogy of place*; and Bronfenbrenner's *ecological model* so as to accommodate the multiple realities, cultural constructs and concepts that were emerging from the data and rich findings (Altman, Kantrowitz-Gordon and Vandermause 2014).

In tandem with Gruenewald's *critical pedagogy of place* (2003), the anticipation is towards developing subsequent interventions that will promote de-colonization and re-culturization of secondary school community spaces. As such, this model articulates that school spaces are imbued with constructs of the larger societal, ecological and historical structures and symbols that promote "situationalities" of difference, social inclusion and exclusion (Gruenewald 2003).

The *symbolic interactionism* theory purports that reality is actively created through the use of language and symbols as well as the roles of emotions, identity and the *self* (Blumer 1986; Fields, Copp and Kleinman 2006). *Symbolic interactionism* articulates both individual and group (collective) behaviours and explains the cultural, symbolic nature of social interaction and meaning making that motivate *deviance* and *social inequality* (Mazotta and Myers 2008). Furthermore, "meanings are handled in, and modified through, an interpretive process used by the person in dealing with the things he encounters" (Blumer 1969 p.2)

To complement the *critical pedagogy of place* and *symbolic interactionism*, *Bronfenbrenner's ecological model* "provides a conceptual framework that draws attention to the combined impacts of social contexts and influences on [adolescents'] behavioral development" (Swearer, Espelage et al. 2010, p. 42). Bronfenbrenner's model is organized around five subsystems, the micro, meso, exo, macro and cronosystems. The first four systems are all interactive and influence each other and the individual, directly or indirectly, over time (cronosystem) due to personal, cultural and societal changes (e.g. technology, politics, music). The microsystem operates in the individual's immediate space that includes family, peers and school and consequently, emphasizes the quality of *proximal processes* that impact the individual in positive or negative ways. The mesosystem considers the cross-linkages in one's microsystem that might affect the individual, such as decisions taken between parents and school. The exo-system confers indirect influences on the individual, such as the impact of a parent's loss of income or divorce; and the macrosystem incorporates the larger, holistic sociocultural infrastructure that might pressure individuals' *microsystems* (Bronfenbrenner 1994 p.40), such as national exams, ministry policies, health facilities and welfare programmes.

Methodology

The Transformative Paradigm provided a suitable overarching philosophical and methodological framework for this study. As such, the Transformative Paradigm recognizes the social construction of multiple realities and the diverse issues of inequality, power and social injustices that pervade those realities. The Transformative Paradigm also asserts that the researcher should be sensitive to their role and the socio-cultural impositions of the research process, in order to better facilitate participant inclusion, voice, challenges of the status quo and quest for social justice and change (Mertens 2007 and 2020, Creswell and Plano Clarke 2018). To that

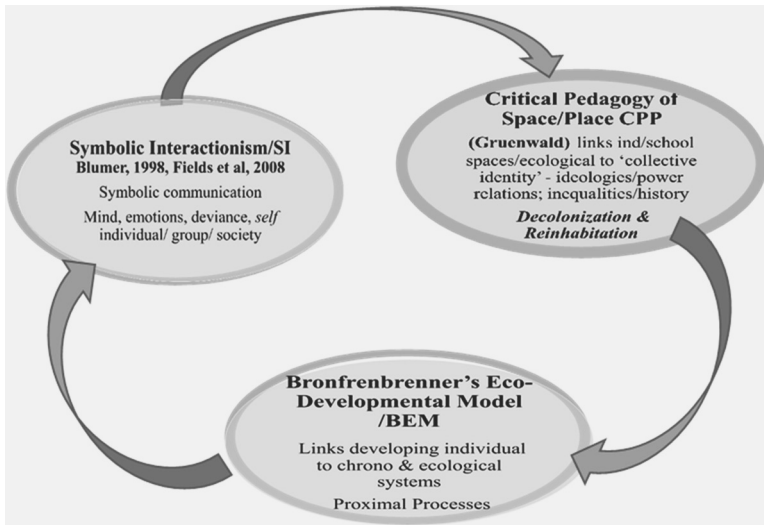


Figure 1: The theoretical framework. Hunt-Anderson (2017)

end, Merten's (2007 p. 212) position is that, "Transformative mixed methodologies provide a mechanism for addressing the complexities of research in culturally complex settings that can provide a basis for social change."

A review of the literature reveals that bullying has more commonly been studied through quantitative measures and self-surveys of students that require further understanding. This warranted a mixed methods design, more specifically a sequential exploratory model (see figure 2) that could exploit the strengths of both qualitative and quantitative research when combined (Leech and Onwuegbuzie 2009). The exploratory sequential model also provided insightful, contextually driven data from the initiating Qualitative study that could inform the development of a culturally authentic instrument for the quantitative phase (Creswell and Plano Clark 2018). The latter phase helped to confirm and elaborate on qualitative findings. For instance, gender disparities could not be determined in the qualitative phase because of the small student sample, male inhibition and a cultural predisposition to "not tell". Integration of both qualitative and quantitative studies took place at two points, during the instrument "building to" phase and then on completion, whereby the (QUAL + quan) findings of both were merged with the aid of joint displays and graphs. Integrating both results helped "to strengthen the rigor and enrich the analysis and findings" (Wisdom and Creswell 2013, p. 4) and provide "a more complete story" (p. 3) of the covert bullying paradigm.

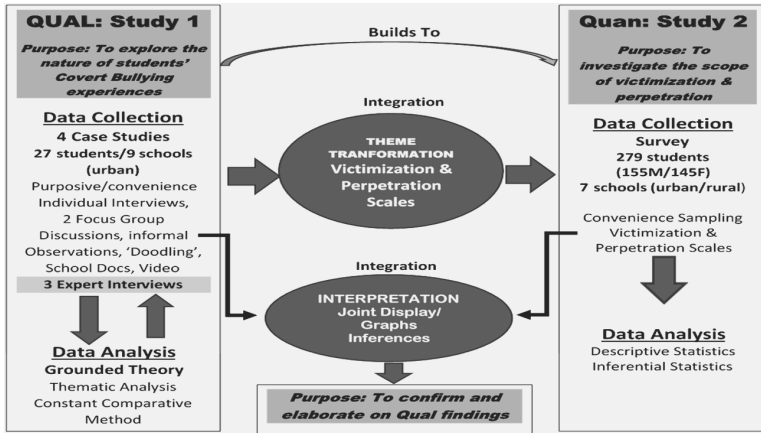


Figure 2: The mixed methods exploratory sequential design

Ethical Procedures

Ethical protocols were observed during both qualitative and quantitative studies to protect student participants and schools from harm. These included gaining signed, informed consent from the institutions, parents/guardians, teachers and students; ensuring full disclosure before any kind of data were collected; informing participants and schools of their rights to *anonymity*; and the *option to leave* the study at any time. In the case of qualitative data, permission for publication of doodling texts and drawings was sought before use; and *member checking* of transcripts was offered to all participants. All the data collected are kept in secure, protected files in my personal office.

Phase 1: The Qualitative Study

A qualitative study was suitably designated to capture information and data that can only be imparted through personal experiences and descriptions (Marshall and Rossman 2010). The main research question developed for this purpose was: *How do students describe their experiences of covert bullying in Jamaican high schools?*

Other sub-questions that guided the study are as follows:

1. *What is the nature of covert bullying experienced by high school students?*
2. *How are students impacted by covert bullying?*
3. *How do students cope with covert bullying in high school?*
4. *Who is a bully? Why do students engage in bullying in high school?*

Four collective case studies were employed to adequately explore the bullying phenomenon within the varied sociocultural contexts of our Jamaican schools and include multiple and diverse participants and investigative strategies (Yin 2003, Leacock, Warrican and Rose 2015). The four case studies represented four school categories – private school; high-performing traditional school; average-performing traditional school; and low-performing school. With the exception of the private case, the cases were organized in accordance with the national performance outcomes of the General School Assessment Tests.

Participants and Sampling

The main participants in the qualitative study were an eclectic group of twenty-seven students (eight males and nineteen females) identified through purposive, convenience and snowballing methods. Participants were chosen based on their willingness to join the study, exposure to bullying at school in any capacity – perpetrator, target or onlooker – and the informed consent of parents, guardians or teachers. Student participants represented nine different secondary schools located in urban Jamaica. Students' ages ranged from 12 to 18 years old across grades 7–12. In addition, three adult participants were also consulted as experts – a pediatrician and two counseling psychologists – who operate special clinics (outside of the school system) for adolescents at risk.

Data Collection and Analysis

The main sources of data collection were through seventeen semi-structured, open-ended individual interviews and two focused group discussions arranged with twelve students selected from the four cases. Informal observations of all participants were carried out during all sessions. Based on the initial interviews and students' willingness, two students also engaged in subsequent interviews, so I could learn more about them. Four interviewees also joined the focused group sessions to facilitate me in observing them while among their peers. Non-verbal "doodling" on paper was incorporated in sessions to allow for discrete and difficult personal expression. Within the representative case schools, I also conducted informal observations, informal conversations with teachers, administrators and students and viewed school documents to assist in contextualizing the four case studies. Authentic evidence of a local bullying school scenario captioned on YouTube was also viewed. Secondary data were subsequently collected

from three local adult experts, referred to as Experts A, B and C, who engaged in open, semi-structured individual interviews.

A grounded theory approach was employed for data collection and analysis (Corbin and Strauss 1998). In an iterative process and until it reached saturation, I organized, coded and categorized (selective, open coding, in vivo and axial) my evolving data from transcripts and other sources across the four cases while maintaining theoretical sensitivity. This was done manually at first, then with the help of NVivo software. The constant comparative method was applied in helping to merge similarities and identify differences across and within the cases, to draw inferences and create themes. Experts' transcripts were also analysed and compared with the themes from student interviews. This enhanced theoretical sensitivity, the credibility of findings and produced "thick rich descriptions" (Findlay 2006).

Credibility and Trustworthiness of Data

To ensure crystallization (triangulation) of qualitative data, multiple sources and types of data collection were engaged and layered to inform the four case studies and produce "thick, rich descriptions". The quantitative phase subsequently augmented the qualitative findings and enhanced the credibility of findings. Reflexivity and memos also played a large role during the journey in addressing challenges, possible biases and maintaining sensitivity to my role as researcher (Findlay 2006).

Qualitative Results

Four main themes evolved from the qualitative questions. Theme 1: "Bullying Situations" responds to – *What is the nature of covert bullying experienced by high school students?* Theme 2: "Impact" responds to – *How are students impacted by covert bullying?* Theme 3: "Coping" responds to – *How do students cope with covert bullying in high school?* And Theme 4: "Profiles and Explanations" responds to the questions – *Who is a bully? Why do students engage in bullying in high school?* Key findings for these themes are outlined in the Bullying Joint Display Table 2 and elaborated on in the Discussions.

Phase 2: Development of the Quantitative Instrument

A student bullying survey instrument (SBS) was developed from key codes and categories that emerged from the Qualitative themes. These

were organized into two scales – Victimization Bullying Scale (VBS) and Perpetration Bullying Scale (PBS), partially adapted from Shaw, et al. (2013). The instrument consisted of twenty-three questions on the VBS and twenty-five questions on the PBS that both utilized a four-point Likert rating scale (*1 = never, 2 = rarely, 3 = sometimes, 4 = often*). A sample item from the VBS scale is *I felt afraid to report bullying situations*. The instrument was piloted to forty-three students, ages 11-19 years old, across seven high schools. These participants, although similar, were not the same participants in the actual study. Reliability and internal consistency of both scales were established with the use of Cronbach's alpha statistics which showed acceptable alphas of VBS = 0.736 (after removing one item) and PBS = 0.835, respectively (Pallant 2016). The population sample underwent normality tests, and it was determined that non-parametric statistics would be more suited for data analysis. Construct validity of both VBS and PBS scales was subsequently established with the larger survey sample using Factor Analysis.

Phase 3: The Quantitative Study

This phase involved administration of an SBS with the use of the instrument that was adapted and developed during the previous stage. Key questions are as follows:

1. *How prevalent are covert bullying victimization and perpetration among students?*
2. *Is there a relationship between victimization and perpetration among students?*
3. *Do location and age make significant differences in perpetration levels?*
4. *How well do gender and age predict victimization levels among students?*

Participants and sampling

In order to ensure that the sample size was adequate for the survey and a subsequent Factor Analysis of the instrument, the sample size was determined by calculating a minimum of five participants per question item (Pallant, 2016). An additional 15% was also added for incidentals such as the need to discard inadequate response sets. Since the survey instrument had forty-eight items in total, the sample size was calculated as forty-eight multiplied by five which amounts to 240. The extra 15% established the minimum sample size as 276 participants. In total, 279 was the actual sample size.

Participants were selected through non-probability, convenience sampling within seven institutions across four parishes in rural and urban areas. In total, 103 students attended urban schools and 176 attended rural schools, 124 males (44.4%) and 155 females (55.6%). These schools represented a diverse range of academic and socioeconomic backgrounds as in the qualitative study. The age range of respondents (N=279) was 12–19 years (M=15.99, SD= 1.87) attending grades 7–11 in high schools and first-year college that was represented as grade 14 for purposes of the study.

Data Collection

With the permission of the respective schools and students' parents, the bullying survey was administered to small groups of students during class periods of approximately 15–20 minutes. This afforded controlled classroom settings. Administrators of the questionnaire were colleagues who were affiliated with these schools. They were briefed beforehand on the relevant information and guidance for participants to ensure the proper protocols for confidentiality, anonymity and students' rights. Noteworthy is that the nonprobability sampling does not allow the research findings to be generalized to the Jamaican population. Hence, the findings here are generalized to only the participant sample of rural and urban school students (Etikan, Musa and Alkassim 2016).

Data Analyses

Descriptive statistics were used first to establish the demographics of the student sample and examine the data. In response to RQ1, Descriptive Statistics were also used to determine the total levels of victimization (VB) and perpetration (PS) (Table 1); and theme-related variables were used to develop these scales. Since the quantitative sample did not meet the assumptions for normality (Kolmogorov–Smirnov showed $p < .05$), non-parametric analyses were applied for the other research questions. For RQ2, Spearman's rho correlation coefficient was calculated to investigate the relationship between victimization and perpetration, following some preliminary analyses to ensure that there was no violation of the assumptions of normality, linearity and homoscedasticity. For RQ3, the Kruskal–Wallis and Mann–Whitney tests were used to evaluate perpetration levels across different age groups (≤ 15 , 16–17, 18+ years) and locations respectively. For RQ4, standard Multiple Regression analysis was

Table 1: Shows Total Perpetration and Victimization levels.

	<u>N</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Mean</u>	<u>Std.</u> <u>Deviation</u>
	<u>Statistic</u>	<u>Statistic</u>	<u>Statistic</u>	<u>Statistic</u>	<u>Statistic</u>
Age (Q1)	279	12	19	15.99	1.872
Total Victimization Bullying Scale (VB)	279	44	87	73.13	7.988
Total Perpetrator Bullying Scale (PS)	279	53	99	85.64	8.969
Valid N (listwise)	279				

employed to investigate how well gender and age predict victimization among students.

Results

The prevalence rates of theme-related variables are outlined in the Bullying Joint Display Table 2. Other results in response to the main quantitative questions are shared below:

RQ1: *What are the prevalence rates of bullying victimization and perpetration among high school students?* Table 1 output shows the mean age, 15.99 years [SD.=1.87], of 279 respondents. The total prevalence rates show mean values of 73.13 [SD =7.99] and 85.64 [SD=8.97] for Victimization and Perpetration, respectively.

RQ2: *Is there a relationship between victimization and perpetration among high school students* Findings showed a moderate and positive correlation between victimization and perpetration [$r = 0.438$, $n = 279$, $p > 0.01$].

RQ3: *Do age and location make significant differences in perpetration?* Although the output showed that the highest level of perpetration mean rank was among the 16–17 years old group, the significance alpha, $p = 0.37$ ($p > 0.05$). This indicates that age does not make a significant difference in bullying perpetration. Mann–Whitney was used to examine perpetration differences across urban and rural locations. The output statistics $Z = -0.56$, $p = 0.58$ [$p > .05$] showed that there is no significant difference in students' bullying perpetration levels based on location, although rural schools had a higher mean ranking.

RQ4: *How well do gender and age predict victimization among students?* Using Standard Multiple Regression analysis, the data output showed beta

values of 0.057 and -0.040 for gender and age, respectively. Gender is the more robust of the two variables and makes a unique contribution of 0.31% to the explanation of variance in total victimization scores, whereas age uniquely explains 0.15% of the variance. However, neither contribution of gender or age to victimization scores is statistically significant, since p values = 0.512 and 0.349 ($p > .05$) for age and gender, respectively.

The Bullying Joint Display Table

To facilitate the process of synthesizing the qualitative and quantitative results, a Bullying Joint Display Table 2 was developed. Guetterman, Fetters and Creswell (2015) posit that a joint display is a visual tool that simplifies the process of analysing and integrating data in mixed methods. It presents a pictorial array of both qualitative and quantitative results that helps the researcher to compare and cojoin the two data sets, draw inferences and gain new insights beyond those that could be determined from the separate qualitative and quantitative results. This will amount to more than the sum of individual results (i.e. $1+1=3$) (Fetters and Freshwater 2015).

Table 2 shows (from left to right) the alignment between students' voices, concise summarized results under four Qualitative themes with five sub-themes and related statistics of theme-derived quantitative variables. A column of Inferences developed through side-by-side comparisons also highlights key segments of confirmation, disparity or elaboration within the integrated findings. New insights that could only be derived with the aid of the quantitative analyses are also included at the bottom of the table.

Integrated Findings and Discussion

The ultimate purposes of integrating the qualitative and quantitative results are to expand and strengthen the conclusions and credibility of integrated findings (Schoonenboom and Johnson 2017). Findings in this section respond to the MMR question – *How have the respective qualitative bullying themes and sub-themes (bullying situations, impact, coping and profiles and explanations) been confirmed and elaborated on by the quantitative results and what new insights have been gained?* Since the Qualitative study plays a more dominant role in the Mixed Design, the findings and discussions are amalgamated under the four Qualitative themes – Bullying Situations, Impact, Profiles and Explanations and Coping and Mitigation. The most extensive theme, Bullying Situations, also has five sub-themes – Conceptualization, Group Structures and Symbols,

Table 2: THEME 1: BULLYING SITUATIONS: 5 SUB-THEMES (i-v), RQ1: What is the nature of covert bullying described in students' experiences?.

Quotes	QUALITATIVE Results	Quantitative Results <i>NB: quan ratios reflect 'often' on VB & PB scales.</i>	INTEGRATED FINDINGS <i>Inferences</i>
1. i) CONCEPTUALIZATION	<i>Minnie: ... it's the way of the culture... Bullying is perceived as a cultural norm or just 'joking';</i>	Over 85% felt that bullying is 'normal' part of culture and 44% perceived it as a 'joking' practice	<i>Confirms normalization of bullying as a cultural practice, but not necessarily as a joking practice</i>

(Continued)

Table 2: (Continued)

Quotes	QUALITATIVE Results	Quantitative Results <i>NB: quan ratios reflect 'often' on VB & PB scales.</i>	INTEGRATED FINDINGS <i>Inferences</i>
1. ii) GROUP STRUCTURES AND SYMBOLS	Bullying Situations are highly facilitated through the peer groups that dictate power, popularity and 'difference' and determine in- and out-group statuses, and communicate deviance	73 % of students associate bullying with 'popular' peer groups; 87.5% engaged bullying to gain popularity and group status;	<i>Confirms</i> that bullying is often associated with 'popularized' peer group structures.
<i>Tiana: your hair has to be long, ... a certain length to get into the group and you are brown</i>	Symbols of Popularity and/or difference are commonly defined through socio-cultural and modern symbols and norms related to money, class, hair type, hair length, skin tone, residential location, physical appearance, hype (promoter guys) and genderization (such as sexual conformity /pretty/ girls; and money/ machoism / boys)	50%- 75% felt their school community link skin colour to social class /wealth and wealth to popularity resp.	<u>Elaboration:</u> Further, school communities promote the wealth and popularity dynamics.
<i>Tamara:.. girls find themselves wanting to be popular ...and have to have sex with guys in the group to become a part of that group...</i>	Symbols of Popularity and/or difference are commonly defined through socio-cultural and modern symbols and norms related to money, class, hair type, hair length, skin tone, residential location, physical appearance, hype (promoter guys) and genderization (such as sexual conformity /pretty/ girls; and money/ machoism / boys)	75% indicated that 'at my school wealth dictates popularity'; 83% encouraged peers to have sex to gain popularity or group status; 87% had sex relations to gain popularity and group status	<u>Confirms</u> that popularity and peer status are defined by symbols of wealth social class, sexual prowess that are pervasive but, to a lesser extent, party promoters that underlie 'difference'.
		59% indicated Popular persons are affiliated with Party Promoters (hype)	

1. (iii) TARGETS AND MECHANISMS

<p>Silas.....if someone is kinda quirky ... socially awkward and stuff, the richest and the poorest can both gang up and bully him....just because he's different...at my school boys that do dancing ... people tease and call them gay and things ... this person was gay, he was bullied a lot.</p>	<p>Targets are construed among those who are different or unacceptable because they do not fully 'fit' the in-group criteria symbols of money, class, colour, appearance, behavior etc. Targets are also construed among the in-group power relations that defy the status quo. Pervasive Mechanisms include mainly Exclusion and Rejection and other varied forms of explicit and implicit aggression. These include verbal abuse, labeling, cyber bullying, 'public'/ media exposure, sexting, gossip, slander, shunning,</p>	<p>73% indicated group targets as 'unacceptable' based on race, hair, skin tone, etcetera; and 81-83% were Excluded or Rejected by a peer group because of money, class or difference (skin tone, hair, body, location, sexuality, clothing, height) 83.5% - my peer group rejects persons who do not have money or class; 63% were teased, labelled, called nasty names or humiliated because of being 'different' ; 91% had personal business exposed on the internet by friends or group members</p>	<p><u>Confirms</u> targets of 'difference' as assigned to persons who do not fully conform to acceptable socio-cultural or pop symbols and norms for money, class, behaviors and/or appearance. <u>Could not confirm</u> the in-group power relations dynamic. <u>Confirms</u> exclusion and Rejection as highly pervasive mechanisms, and <u>Elaboration:</u> Personal Exposure via cyber /media is the most common mechanism</p>
<p>1. (iv) ADOLESCENCE Sariana: ...teenagers are insensitive bad because they don't think!, they pulled up pictures they got off the internet</p>	<p>Adolescent sensitivity and 'neediness' for self- affirmation and popularity exacerbate teens' vulnerability to bullying</p>	<p>81.4% engaged bullying to define the self as a leader</p>	<p><u>Confirms</u> the need for self-affirmation and popularity/ leadership</p>

(Continued)

Table 2: (Continued)

Quotes	QUALITATIVE Results	Quantitative Results <i>NB: quan ratios reflect 'often' on VB & PB scales.</i>	INTEGRATED FINDINGS <i>Inferences</i>
<p>1. (v) TEACHER INDISCRETIONS</p> <p><i>Kayla: they clap for the 90s. Anything under 85 there is no response -at all. I start feeling, like bad about myself, like I did bad... like they look down on me</i></p>	<p>Teachers' bullying and aggression (direct & indirect), unawareness and insensitivity promote peer bullying and lack of trust in the status quo</p>	<p>More than 55% experienced incidents of teacher discrimination and insensitivity</p> <p>54% also indicated my teacher was insensitive or overlooked remarks, gestures that embarrassed me</p>	<p><i>Confirms</i> the practices of teacher indiscretions and insensitivity but on a <u>less pervasive level</u> than was implicated in the qualitative findings.</p>

THEME 2: IMPACT

Quotes	QUALITATIVE Results	Quantitative Results	INTEGRATED FINDINGS
<p>Saviana: 'I felt bad because, I really couldn't do anything about it'... 'the friend who sees everything take place... is also scared'</p>	<p>'Feeling bad'/sad', humiliated, helpless and fearful are common emotions experienced by both victims and bystanders exposed to bullying episodes. Sustained impact include low self-esteem (See Kayla's doodling above), anxiety, depression, anger, holding grudges, isolation and the 'left over' effect</p>	<p>NB: <i>quan ratios reflect 'often' on VB & PB scales.</i> 30% of students reported being negatively affected by observing bullying 66% of victims were afraid to report incidents; 80% of students experienced low self-esteem because of bullying incidents while 80% struggled with depression</p>	<p><i>Inferences</i> Confirms the high prevalence impact of Low self-esteem Elaboration: However, depression is equally prevalent and more pervasive than implicated in Qual findings. <i>Disparity</i>: Bystander impact is also far less than implicated in Qual study</p>

(Continued)

Table 2: (Continued)

Quotes	QUALITATIVE Results	Quantitative Results <i>NB: quan ratios reflect 'often' on VB & PB scales.</i>	INTEGRATED FINDINGS <i>Inferences</i>
THEME 3: COPING	QUALITATIVE Results	Quantitative Results <i>NB: quan ratios reflect 'often' on VB & PB scales.</i>	INTEGRATED FINDINGS <i>Inferences</i>
<i>Tom: 'friends are the best thing... it's hard to get through the school system without them'</i>	The most common Coping mechanisms include peer friendships and support crews	53% 'often' used Friendship support to cope with bullying incidents	<u>Confirms</u> the importance of 'friendship support' systems as a coping mechanism <u>but</u> not as prevalent as expected
<i>Sariana: when you build self-esteem as a group and decide "okay I'm going to put a stop to this;" ... you can call me fat, call me ugly, but there is still a smile on my face.</i>	For Mitigation measures- 23 of 27 student participants voiced the need for 'strong' peer support systems (non-politized & trained) and bystander intervention. Other suggestions included raising teachers' awareness; and implementing active school policies		<i>Note: Mitigation was not addressed in this study</i>

THEME 4. PROFILES AND EXPLANATIONS

RO4: Who is a bully? Why does bullying occur in high school?

Quotes	QUALITATIVE Results	Quantitative Results	INTEGRATED FINDINGS
<p>... <i>Sariana...it might sound crazy but we are travelling back from slavery days...We are formed by our society in this thing(bullying)</i> <i>Silas: "the main reason people get bullied is from differences. People are scared, not open to people who are different from them... "</i></p>	<p>Participants' description of a bully is an 'attention seeking' leader who uses bullying as a tool for survival or gaining popularity, power and control, or someone who has low self-esteem and issues at home. Students made connections to the, history of plantocracy, sociocultural norms and power structures in our society that dictate our 'differences' and drive aggressive behaviors (e.g. Figure 4)</p>	<p><i>NB: quan ratios reflect 'often' on VB & PB scales.</i></p> <p>73.8% used bullying to gain power and control; and 57% use bullying for survival in the system</p> <p>81% use bullying to define self as a leader</p> <p>87.5% engaged bullying to gain popularity and group status</p> <p>Over 85% indicated that they bully because bullying is a 'normal' part of our society and culture</p>	<p><u>Confirms</u> that bullies engage bullying as a means/tool for gaining popularity, status, defining self, leadership, power and control (in that order) and because it is a 'normal' part of our society and culture. Although confirmed, there is <u>less prevalence on need for 'survival'</u></p> <p><u>Could not confirm</u> the victimization profile</p>
<p><i>Other Insights gained from the quantitative results:</i></p>	<ol style="list-style-type: none"> 1. Both Perpetration and Victimization show high 'generalized' levels within the sample population 2. Neither age nor location make significant differences in perpetration levels 3. There is a moderate positive correlation between perpetration and victimization 4. Gender and age are not significant predictors of victimization, although Gender makes a larger contribution to explanations of variance in victimization 		

Adolescence, Teacher Indiscretions and Targets and Mechanisms. Discussions draw on the local and international literature, theories that frame the study and the findings from the three local experts referred to as Experts A, B and C who help to provide context and support for the voice of student participants.

Theme 1: Bullying Situations

Conceptualization

The integrated findings have helped to establish that, although local students and teachers understand the concept of covert bullying, more than 85% of students “often” perceive bullying as a “normal” part of culture and to a lesser extent, that it a “joking” practice since only 44% indicated this. In a blended socio-economic focused group discussion, Minnie, Peppa and Wingz argued if openly labelling an overweight person is indeed bullying. Minnie declared, “I can’t think of it as bullying...just the way of the culture”. Jason below (figure 3) provided an example of “joking”. It reads, *you took my pencil because your [you are] black*. The norming and cultural factors have been highlighted in several studies on bullying particularly in relation to why children “do not tell” and why adults often overlook or dismiss the related issues (e.g. Cross et al. 2009; Martocci 2015; Kruger 2011). Although local experts in the qualitative study concur that “adults may not be aware...or...take it seriously enough” (Expert A’s interview: Feb. 2015) or choose to ignore it (Expert C’s

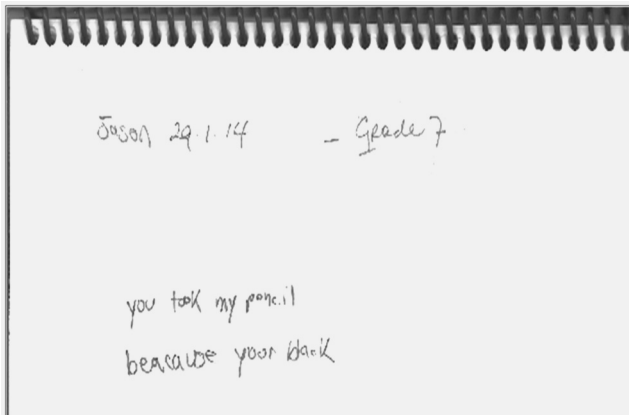


Figure 3. Jason’s (PS, Gr.7) doodle shows his example of “joking” culture Hunt-Anderson (2017)

interview: Feb. 2015), the norming practice among teachers and adults was not investigated in this study and therefore could not be established. The *joking* culture that promotes racial slurs and stereotyping indicated here is also illuminated in studies done by Feinberg and Robey (2009), Olweus (1996) and Caribbean researcher, Smith (2010).

Social groupings and symbols

Integrated findings confirm that 73% of students, more often than not, affiliate bullying with "popularized" peer group structures. Students' narratives revealed several different popularized peer structures that facilitate bullying, including the social, lunch, mixed, classroom, friendship, crews, gangs and cyber groups, each with their idiosyncratic set of symbols and norms. Findings, however, establish that 87% of students associate popularity and peer status with symbols of wealth and social class. This in effect, dictates in- and out-group acceptance as well as the behavioural and relational dynamics both within and outside of the peer group. Moreover, integrated findings elaborate that school communities promote the symbols of wealth and popularity. In total, 50% of students indicated that their school community links wealth to social class and skin colour and 75% posited that in their school "wealth dictates popularity". Local researchers, Evans (2009) and Thomas (2010), confirm the socio-cultural, economic and historic symbols that undergird socio-educational issues, politics, power relations and differentiation especially in light of Jamaica's legacy of slavery, colonialism and capitalism. In tandem with qualitative narratives, sexual promiscuity and coercion are also highly pervasive for gaining popularity and status, although the link to co-ed or specific groups established in qualitative themes was not investigated. In support, 83% of students encouraged peers to have sex to gain popularity or group status and 87% had engaged in sexual relations to gain popularity. Mentioned later, Dunne, et al. (2010), Klein (2012) and Stein (1995) recognize the norms associated with sexual harassment and gendered aggression in schools.

Targets and Mechanisms

Integrated findings confirm that targets of "difference" are commonly assigned to persons who do not fully conform to acceptable socio-cultural or popular symbols and norms related to money, class, behaviours (including sexual) or appearance. In total, 73% of students indicated group targets as "unacceptable" based on their race, hair, skin tone and so on.

It also confirms that while exclusion and rejection are highly common mechanisms in tandem with many literature (Groppe and Froschl, 2000; Horton, 2011; Khosropour and Walsh, 2001). That is, 81–83% of students are excluded or rejected by a peer group because of money, class or difference (skin tone, hair, body, location, sexuality, clothing, height). Nonetheless, the findings establish that sexual aggression is just as pervasive as exclusion and rejection (83%) and further, that personal exposure via cyber bullying is even more pervasive than exclusion, rejection or sexual aggression. In keeping, 91% of students had their “personal business” exposed on the Internet by friends or group members. While the latter finding has not been seen in studies, the pervasive level of this finding was not implicated in the qualitative results. On another level, findings that surfaced in qualitative narratives that speak to the in-group power relations will require further investigation.

Sariana (Gr. 11) in her interview explains that, “sexual bullying is the worst of all! “These groups tend to target younger girls in grades 7, 8 and 9, who are “easy” and “pretty”, “brown” or “rich” girls. Boys might require sexual favours from girls or face coercion from both boys and girls to perform sexually. Girls too are under pressure from boys and other girls, to be “pretty” and slim bodied. Wingz (Gr.13) explains the “popular” models for guys and girls in her interview:

for guys to be popular, money is more important than looks... once you have money, because you can buy a car, you can buy tickets to this party, you can buy gas money to carry us out. Once you have money. It doesn't matter about looks at all, just money.... However...pretty looks goes hand in hand with money for girls to be popular.

Several combinations of these mechanisms have been identified in research studies on school bullying, relational, indirect or social aggression (Dunne, et al. 2010; Smith 2004; Kruger 2011) although not necessarily as covert practices. Local experts in this study shared similar emphases on the practice of sexual activities and coercion, seemingly more common among students from lower socio-economic circumstances. Narratives also prominently tied sexual promiscuity to popular party promoters who perpetuate the entertainment and party subcultures that display female prototypes and sexual prowess (Williams, April 2017). However, only 59% of students reported that popular persons are “often” affiliated with party promoters which presents some disparity.

Although local experts did not expound much, they supported the sexual harassment and pressure, especially on girls, to meet male expectations for sexual responses, relations and appearance. Expert A confirmed that, “socio-culturally ... girls are led to believe that ...guys are in charge” (Extract

from Expert A's interview, Feb. 2015). Studies including Abuya (2013), Dunne, et al. (2010), Klein (2012) and Stein (1995) support sexual harassment as a form of "gender-based violence" such as sexual stereotyping, "sexism and patriarchy" (Dunne, et al. 2010 p.3) and "social demands created by the larger culture" (Klein 2012 p.3). However, unlike Dunne et al., who posit that males are normally the perpetrators of sexual harassment towards females, qualitative student narratives support Klein's (2012) position that girls are also active agents of sexual harassment of other girls and sometimes boys, to conform to male expectations. This could be because, as Stein (1995) proposes, the consequences of homophobic and sexual aggression in schools are more "public... causing greater humiliation and embarrassment" (p. 149) than class or race discrimination issues. However, the integrated findings did not confirm the role of gender differences on victimization. It revealed that although gender makes a larger contribution to explanations of variance in victimization than age, it is not a significant predictor of victimization.

Sariana (GP, Coed, Gr. 11) highlights below the dynamics of adolescence and exposure of one's business via cyber bullying in an incident with a girl who was caught kissing a boy:

...she had low self-esteem...she could do her work and all, but you know, when you're going to high school, your hormones and all of that and an incident happened...teenagers are insensitive bad because they don't think, they pulled up pictures, other pictures that they got off the internet...

Local experts noted cyber bullying to be more prevalent among girls but made no mention of socio-economic imperatives. The literature also establishes cyber bullying as a common practice among students, especially adolescents, but does not indicate the roles of socioeconomic status or gender (e.g., Cross, et al. 2009; Spears, et al. 2008; Smith 2010; Seeley, et al. 2009; Kruger 2011). These researchers agree that cyber bullying facilitates more indirect, relational and covert forms of bullying except for Spears, et al. (2008), who challenge the *covert* since the Internet is a public forum.

Adolescence

Two characteristics of adolescence are prominent in bullying situations that impact students' self-esteem. First is students' "neediness" for self-affirmation and identity that drive their motivation for attachment to "popularized" peer groups although it increases their vulnerability. Integrated findings confirm that 81% engaged in bullying to define the self and 87.5% of students "often" engage in bullying to gain popularity

and peer group status. Local experts' position is that "*adolescents are searching for their identity*" (Extract from Expert B's interview: Feb. 2015) which motivates their "*needing to be popular, needing to be accepted, and needing to fit in*" (Extract from expert C's interview: Feb. 2015). On the other hand, the insensitivity of peers plays on the adolescent vulnerability factor that often leads to low self-esteem. In total, 80% indicated that bullying lowered their self-esteem. Sariana explained the opposing dynamics of adolescence:

Teenagers are so horrible...and because of the fact that she was so desperate for a friend, but who she turned to in order to get one was wrong and they [the peer group] realized it so they tormented her.... Who she turned to was the group itself for a friend.

Salmivalli's (2010) review of studies on group processes shows that, especially among adolescents, bullies (group) are often perceived as powerful and popular by peers even when they are disliked (Salmivalli, Lagerspetz, Björkqvist, Österman and Kaukiainen 1996). Wingz explains in one of the focused group discussions, "*you want to be seen with a group of people to make yourself feel important, whether they are your friends or not!*" Psychologists too posit that peer affiliation plays a key role in helping developing adolescents to establish self-efficacy as they explore and seek ways of coping with their environment (APA 2002; Feldman 2008). The impetus for popularity seeking may also be explained from a Symbolic Interactionism perspective, whereby teens are impulsive, pragmatic and "*act towards things*" such as group affiliation and social symbols (popularity, status and power) that they assign meaning to and are important and work for them in helping to establish their sense of identity (Burns et al., 2008; Blumer 1986). The *insensitivity* factor is also implicated in other studies (e.g. Batsche and Knoff 1994; Bullock 2002; Khosropour and Walsh 2001; Olweus 1996) that characterize bullies as impulsive and non-empathetic, regardless of low or inflated self-esteem. Adolescents' insensitivity may also be argued from Symbolic Interactionism's position that impulsivity and the *self-seeking* motive are markers of adolescence or Bronfenbrenner's perspective that if the student places enough importance on making affiliation/s to gain popularity (self-motive), some effort or sacrifice may be required including having to adopt the affiliate or group's attitudes (e.g. insensitivity) or activities (e.g. aggression).

Teacher Indiscretions

Across all the case studies, students' compelling accounts revealed that teachers' discrimination, insensitivity and shouting practices impact

students in negative ways and facilitate bullying situations. In total, 55% of students confirmed that they "often" encountered teacher discrimination by way of grading, Socioeconomic Status, race, religion or favouritism; and 54% indicate that their teacher was "often" insensitive to or overlooked peers who whispered, made remarks or gestures that embarrassed them or others. Expert C in this study remarked that, *"You know teachers sometimes are not careful with the words they use; they speak negatively, they call the children names, they disrespect the students"* (Extract from expert C's interview: Feb. 2015). Narratives showed that acceptable forms of differentiation, such as "calling out" of grades in class, promote covert bullying. As such, 46% of students confirmed that classmates use silence or loud clapping to differentiate between acceptance and non-acceptance. Kayla (HP, Gr. 9), a new student who transferred from a GP school to a HP school explains, *"they clap for the 90s. Anything under 85 there is no response -at all. I start feeling, like bad about myself, like I did bad, like they look down on me.. I get in the 70's..."*.

The insensitivity factor aligns with the lack of support, skills or inappropriate responses of adults that prevail in studies (e.g. Cross, et al. 2009) particularly among boys and older children (Education.com 2010; Reid, Monsen and Rivers 2004). In support, university students in a local study reported that verbal humiliation especially from teachers had adverse long-term impact (Pottinger and Stair 2009) on them. Harris (2009) adds that teachers contribute to the prevalence of aggression, *bullying* and negative school climate based on their attitudes and classroom norms, intensifying bullying "hurt" (Salmivelli 2010), reducing teacher- student relations (Olweus and Limber, 2010) and trust and cohesion (Williams and Guerra, 2011). Bronfenbrenner's model also expounds that the proximal processes in developing adolescents' micro-system (activities, social roles, interpersonal relationships) are likely to be a function of influential settings, such as school, teachers and peer groups depending on "particular physical, social and symbolic features" (Espelage and Swearer 2010, p. 40). Local experts' accounts and other research also accentuate students' experiences of the attitudes and insensitivity of teachers (Harris 2009; Lambert, et al. 2008; Pottinger and Stair 2009; Thompson, January 2009) and general lack of awareness (Cross et al., 2009; Feinberg and Robey, 2009)

Theme 2. Impact

In tandem with qualitative themes, approximately 80% of students indicated "often" experiencing low self-esteem as a sustained outcome of

being bullied. However, the findings also revealed that an equal ratio of students (80%) also experienced depression or anxiety which was not as prevalent in the qualitative narratives. The literature supports these outcomes (e.g. Batsche and Knoff 1994; Dunne, et al. 2010; Seeley, et al. 2009; Spears, et al. 2008; Thomas 2010). These outcomes are supported by the local experts' narratives who added suicide, truancy and poor school performance to the list of local bullying outcomes. Based on their findings, Soyibo and Lee (2000) explain that bullying is a local problem that exacerbates students' emotional instability.

Interestingly, in the context of Jamaica's multiethnic society, Miller's (2004b) study of high school girls shows that self-esteem and anxiety are tied to varying levels of skin colour and socio-economic status. This might explain some of the relational tension between students of light and dark skin tones and higher and lower socio-economic status and the emphasis on graduated skin tones in this study.

One notable emotion of bystanders and friends in qualitative narratives was that they felt impacted by observing their peers being victimized, but felt restraint and helplessness in being able to come to their aid. Surprisingly, only 30% of students reported being affected by observing bullying although 66% of students reported being afraid to report bullying incidents. Poyhonen, et al.'s (2012) research reports that a bystander's response is influenced by their perception of possible (negative or positive) consequences and the value (what do I have to gain) they place on those outcomes for themselves.

Although not confirmed in the survey, narratives revealed the "left over effect" from unresolved prior issues that heightens emotional sensitization and a predisposition to subsequent victimization and struggles with low self-esteem, even among those who appear to be more resilient. The literature does not mention "unresolved issues" but concurs that low self-esteem does exacerbate and perpetuate the cycle of bullying (Rigby 2003) and that psychological issues such as anxiety and depression may be imposed through former memories of being victimized (Bond et al. 2001). Local experts A, B and C also concur that victimization will tend to lower adolescents' self-esteem and increase their vulnerability to being bullied again, even for students who seem well-adjusted.

The latter findings are important because they provide a basis for why these victims sustained "built up" feelings of anger, keeping a grudge, depression, self-incrimination and suicidal ideation among other negative effects. This sustained impact is supported by local expert, Dr A, who

said, "sometimes... it sticks with them for a long time" (Extract from expert A's interview, Feb. 2015). Pottinger and Stair (2009) also found that local university students sustained negative long-term impacts from their bullying experiences in high school. These discussions further support the argument of underestimating the emotional impact of bullying in even seemingly unimportant incidents (e.g. Kruger 2011; Martocci 2015).

Theme 3. Coping

Across all school cases, students' main coping mechanisms for mitigating bullying were through close personal friendships and support groups. Although integrated findings confirm this friendship support, it is far less than expected based on narratives since only 53% of students "often" use friendship support to cope. Sariana (Gr.11) shared below that:

when you build self-esteem as one, as a group coming together and decide say (that) "okay I'm going to put a stop to this!" but how? When you show the actions that you can call me fat, you can call me ugly, but there is still a smile on my face.

The narratives further highlighted that students who have friendship support seem more confident in resisting bullying despite the negative emotional impact and self-esteem issues they have sustained. Others with waning friendships were inclined to report the abuse, seek counseling, focus on school work or disassociate themselves from others or ultimately transfer schools. The importance of *friendships* more than *family* is supported by Dunne et al., (2010) and Rethon, et al. (2011). Local experts were not able to address the supporting role of friendships, but also asserted that resilient attitudes and parental support will aid resilience and faster recovery of victims despite the negative impacts. Other forms of support (such as family) and mitigation measures were not investigated in this study due to the length of the survey instrument. However, it is useful to mention that in narratives, twenty-three of twenty-seven student participants voiced the need for "strong" peer support systems that are non-politized, trained and monitored. They also valued the need for bystander intervention. Other suggestions included raising teachers' awareness and implementing active school policies.

Theme 4. Profiles and Explanations

In order of prevalence, the integrated findings confirm that students "often" engage in bullying as a means or tool for, gaining popularity

and status (87.5%), defining the self and leadership (81%), gaining power and control (74%) and necessary for survival (57%). In total, 85% of students also perceive it as a normal part of our culture (85%). The penchant for low self-esteem and issues at home was not confirmed in these findings although voiced in narratives. Integrated findings also confirmed, for the most part, the influences of socio-cultural and historical symbols and norms and from the local society found in students' qualitative explanations for bullying (figure 4). Adonai (Gr.11) perceived bullying as a "natural" cultural tool for overcoming "fear" and establishing one's "authority", whereas Silas (Gr. 12) felt strongly that, "the main reason people get bullied is from differences". This was confirmed by over 80% of students in integrated findings.

The pro-social construct of bullying is supported by Spears, et al. (2008) and Terashjo and Salmivalli (2003, p.150) whose bullying repertoires show that bullying is sometimes perceived as "unproblematic" "justified" or "deserving". The bullying composite for survival, leadership, power and popularity might also implicate inflated self-esteem as proposed by Bullock (2002), whereas *personal/home issues, low self-esteem or seeking or diverting attention* aligns with the literature's description of the *bully-victim* (e.g. KSSRC 2012; Olweus 1996, 2003; Smith and Brain 2000) who likely has family issues and been victimized (Batsche and Knoff, 1994).

Whether victims are passive or assertive most victims are subjects of *difference* (e.g. Miller, et al. 2013; Williams 2008) by way of unacceptance or non-conformity that develops through the socio-cultural and economic processes and power relations asserted in some of the literature

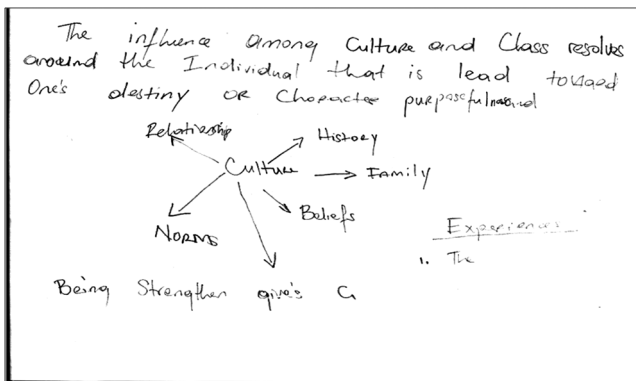


Figure 4. Adonai's (GP, Gr.11) doodling depicts the influence of culture and class on the individual's character and actions Hunt-Anderson (2017)

(e.g. Horton 2011; Phoenix 1998; Reid, Monsen and Rivers, 2004; Terashjo and Salmivalli 2003; Khosropour and Walsh 2001; Kruger 2011). Students have also established the links between class, race, colour *differences* and Jamaica's history of plantocracy, post-colonialism and other socio-cultural and economic systems and bullying (figure 4). These findings concur on several levels with local researchers (e.g. Chevannes 2006, Miller 2004a, Miller, et al. 2013, Kasafi Perkins 2013, Stone 1992, Thomas 2010). M.G. Smith (cited in Sherlock and Bennet, 1998, p. 390) described post-Independence Jamaica as a "plural society" because "divisions and differences were so many, so deep" while Chevannes speaks to the unchanging nature of our social relations. Local experts' accounts also support the underlying roles of socio-cultural symbols and socio-economic factors in behaviour outcomes of difference, rejection and bullying among students.

Furthermore, in tandem with Sariana's statement that, "*we are an aggressive people*" local expert A pointed out Jamaica's cultural propensity for violence by stating that, "*we have a culture where you can't back down, so even if somebody says something to you very minor, you can't just leave it alone.*" (Extract from expert A's interview: Feb. 2015). Shin Kim, et al. (2006) concur that aggression is a cause rather than a consequence of bullying, intensified by the antecedents of bullying.

Other explanations for bullying in students' narratives underline the "systemic" or ecological perspectives of several researchers (e.g. Craig and Peplar 2003; Holness and Forrester 2008; McGuckin and Minton, 2014; Thomas 2010; Williams 2008). The findings also support Bronfenbrenner's bio-developmental model by identifying issues or influences that permeate the larger society and culture, community in some instances, school, teachers, family and parenting and attitudes of students. From a *critical pedagogy of place* perspective, it becomes apparent that school spaces are indeed subjugated by the entrenched cultural, historic (post-colonial) and popular symbols, norms and values of the larger society and other ecological systems (home, parenting, community, church, politics) that create platforms for social inequities, differences and inclusion and exclusion among developing adolescents. *Symbolic interactionism* further explains how the group adheres to what it finds in common (e.g. socio-economic symbols and norms) as part of "group think" or culture. Never mind that, during the interactive process, individuals will still strive to develop or maintain their unique psychosocial constructs (e.g. past experiences, social and moral values of family, church). This will likely lead to personal differences, although "minding" helps each person to assuage what works for them in different situations.

Other Insights Gained

The quantitative study illuminated some important findings that were undeterminable in the qualitative study and provide additional insight on covert-related victimization and perpetration within the sample of local schools. These are as follows:

1. Both Perpetration and Victimization show high prevalence rates. Perpetration levels are somewhat higher among girls and victimization higher among boys.
2. Neither age nor location makes significant differences in bullying perpetration levels, although there is a reduction tendency as age increases.
3. There is a positive and moderate correlation between perpetration and victimization. Hence, as perpetration increases, so will victimization.
4. Gender and age are not significant predictors of victimization. Gender, however, does make a larger contribution to explanations of variance in victimization.

Raising Awareness, Policymaking and Intervention

The implications from findings clearly show the need for developing programmes that will raise awareness and policies and intervention strategies that will mediate the bullying paradigm. Students' voice and involvement are imperative. Since influences of the larger society and its socio-cultural and ecological factors are an imminent part of this study's findings, taking things to national level will be important for educational policymaking, curriculum design planning and planning national programmes to inform and effect change. Literature shows that whole school models that include national efforts and all stakeholders including parents and communities have had the greatest success. However, the problem must first, "be defined and understood in the same way by all parties" for it to be addressed effectively (Williams 2008 p.7). This will have to include all stakeholders.

School programmes will need to focus on intermediating negative peer group structures and symbols that perpetuate deviance, rejection, social exclusion and gendered spaces. If symbolic structures can be identified, then the prospect of modification to reconstruct meanings among interacting actors in situations can be examined (Williams and Dingwall 2014; Blumer 1986). More importantly, schools will need to focus on a programme of re-culturizing and recolonizing the curriculum and school environment

respectively to promote positive symbols of diversity and equity, inclusion, tolerance and respect. Suggested in the findings, the implementation of strong, positive, and trained peer support systems and role models to strategically intercept negative peer structures mediates the peer processes and provides support and peer counsel which are imperative. These role models should be able to lead the mantra of positive trends for other youth.

Teachers' indiscretions and discrimination in findings were prominent. The implications are that, moving forward, the pre-service teacher selection should include psychometric evaluation of attitudes and affective tendencies such as discrimination and aggression that might compromise the quality of student life. Secondly, since bullying is so common in school systems, pre-service curriculum and training should inform on the socio-cultural dynamics of bullying. Teacher training should also build the socio-emotional intelligence, affective and conflict management skills and the adolescent developmental phase. In addition, teacher development should focus on *counseling*, seminars and workshops and evaluation that includes student evaluation.

Based on the Bronfenbrenner's Model and literature, the implications are that the quality of proximal processes nurtured by way of teachers' attitudes and affective skills and the school curriculum and environs will need to focus more on cultivating a culture of trust, support and security. Given the sensitive nature of bullying and adolescents' developmental stage, support should be made strategically "subtle" yet "strong". "Subtle" might be giving students access to anonymous phone lines that offer discrete emotional support and outlets, while "strong" support should be visible, public anti-bullying campaigns, commitment posters, diversity and equity clubs and school events that are all designed and promoted by students themselves.

Concluding Remarks

To a large extent, the MMR has confirmed and elaborated on the main themes and variables that were developed from the Qualitative findings. However, there are aspects that still warrant further investigation such as the peer group relations and mitigation measures.

Based on this study's findings, covert bullying may be defined as any persistent mix of offences or aggression (physical, social, psychological), with or without intention, towards another that elicits negative emotions and outcomes (including low self-esteem and depression), yet remains concealed from, ignored or inadequately dealt with by adults and school

system. From a Critical Pedagogical perspective, peer bullying is a youth culture that thrives in "collective" school spaces that are entrenched in post-colonial, socio-cultural and popular symbols and codes adopted from the larger society. Within the confines of a diverse school community, adolescents feel compelled to draw on these influences (what they know) to fulfill the adolescent needs for self-identity, popularity, power and a sense of place. Although the intention is to promote inclusion and diversity (Thomas 2010), *differences* are heightened and as a consequence, the quality of student interactions and relations becomes compromised. As Horton (2011) further intimates, the intentionality is not necessarily on aggression (bullying) although the outcome might be such.

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How Context Influences the Continuing Professional Development of Teacher Educators Within the Ecological Environment of the Island Territories of the Organisation of Eastern Caribbean States

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Abstract

The continuing professional development (CPD) of teacher educators (TEs) has been receiving more attention over the past two decades globally. Reportedly, TEs have transitioned directly to teaching in higher education as school teachers without formal preparation or support in some cases. My study aims to understand issues that promote and/or hinder the CPD of the TEs within the ecological environment of the Organization of Eastern Caribbean States and identify policy areas as a response to issues raised. The Ecological Systems Theory of Human Development was used as the theoretical framework. A Mixed Method, exploratory, sequential QUAL-quant design, is used. Data were collected in Phase 1 through semistructured interviews from six TEs and eight other participants who occupy different levels of the ecological context. In Phase 2, an online survey which was informed from the interview responses was developed and administered to the population (n=53) of the TEs. Data analysis was conducted using thematic analysis and simple descriptive statistics for the phases, respectively. Integration occurred at reporting and discussion of findings. Findings revealed that participants value CPD, but a weak CPD culture exists. Findings indicate lack of financial support and recognition for CPD efforts, heavy workload, family commitments, costs, time, and appropriate support from the various systems within the ecological environment hindered more than promoted their development. A consensus emerged

among participants that proper systems and policies are needed to systematically address the CPD of the TEs. Recommendations are made in light of the findings.

Keywords: continuing professional development; teacher educators; human development; ecological environment.

Introduction

The work and development of teacher educators (TEs), who are primarily trainers of teachers, have been under-researched over the years (Knight et al. 2014; Kosnik et al. 2015), but efforts, albeit "a trickle of papers", are now being made to learn more about this field of educators (Bahr and Mellor 2016, 64). Hence, the focus of this paper, the continuing professional development (CPD) of TEs, addresses the gap that exists in the literature with this group of specialist teachers. In addition, with this research being the first of its kind in the research context, coupled with the absence of rich documentary evidence on the topic in the region, it presents new knowledge regarding the TEs' CPD.

CPD refers to the ongoing life-long learning of individuals in their professional disciplines to keep current while building one's career and personal development to provide quality service within the workforce (Friedman and Phillips 2004). A Task Force for Teacher Education commissioned by the Caribbean Community (CARICOM) defined CPD as: any professional learning activity beyond initial teacher preparation {sic}. It includes the range of learning programmes from formal courses leading to additional qualifications to workshops and short courses and informal collaborative activities geared to special purposes. Also is referred to as in-service professional development. (CC Task Force 2011, 10)

Taking these ideas of CPD into consideration, for the purpose of this paper, Antonio (2019, 15) has defined CPD as: "The ongoing professional learning engagements in which full-time TEs who are located in post-secondary/higher education (HE) institutions participate. The activities may be of different kinds (forms and types) that could be planned or arranged in a variety of ways to meet different purposes".

Antonio (2019) has proposed that forms of CPD would be those that are formal, informal and those resembling communities of practice arrangements. CPD, in which the locus of control determines who guides the CPD, are termed "types" of CPD. Antonio (2019) has identified standardized, site-based and self-directed (Gaible and Burns 2005) as types of CPD. The purposes for which the TEs engaged in CPD would be for transmissive, malleable and transformative reasons (Kennedy 2014). Further explanations can be accessed in Antonio (2019).

The term TEs can incorporate a number of subgroups in teacher education, especially as it relates to their disciplines (Kosnik et al. 2015) and where their work is situated, for example, in schools as coaches. In this research context, however, TE refers to those who formally teach student teachers, at Associate Degree levels, to become primary and secondary school teachers in their Departments of Teacher Education (DTE). The DTEs are located in community colleges within each of the five island territories of the Organization of Eastern Caribbean States (OECS) specific to this research boundary.

The OECS is an international organization established in June 1981 by seven small island-states in the Caribbean. The strategic objectives of the OECS focus on membership, free movement of people among the islands, integration among members, security and economic priorities. The education arm, the Education Development Management Unit (EDMU) of the OECS, is responsible for harmonization of education in the union in the areas of policy, curriculum development and teacher training. It follows then that the work of the EDMU should include the development of TEs in the OECS.

The main purpose of this research was to explore, examine and present the factors that promoted and/or hindered the CPD of TEs in the ecological environment of the OECS. How these factors were manifested will also be explored. It is to be noted that this paper is part of a larger Mixed Method Research (MMR) which was submitted as my doctoral thesis, entitled—Continuing Professional Development of Teacher Educators within the ecological environment of the island territories of the Organization of Eastern Caribbean States. The Ecological Systems Theory. Bronfenbrenner (2005), which relates to the context in which development occurs, was used to examine the phenomenon.

The aim of this MMR research, therefore, is to use the findings to contribute to anticipated transformational outcomes in teacher education having heard the voices of the actors in the field (TEs and educational leaders). Recommendations are made for changes to be made for improvement in the field.

CPD pathways

Loughran (2014) proposes a professional development pathway for TEs. In his discourse, he explained how a TE moves from becoming a TE to articulating the scholarship of teacher education, but stressed that focused and explicit professional development is required for them to gain knowledge of "teaching about teaching and learning about teaching" (Loughran 2014, 277). Earlier, Smith (2003, 203) contends that there is no "fixed route" for

TEs to follow as they develop. However, whatever the CPD pathway, the activities should be transformational, that is, moving TEs from a state of being novices to developing expertise (Herbert and Rainford 2017) in this specialized field. Elsewhere, I have written of the benefits of TEs engaging in a wide range of professional development opportunities (Antonio 2019). CPD then strategically addresses different goals and outcomes pertinent to the TE's needs, and by extension, the needs of the institution they serve.

Background and context of the study

Since the abolition of slavery in the OECS islands in 1834, efforts have been afoot to develop our educational system which traditionally is strongly rooted in the British system. The training of teachers over the years has experienced a confluence of changes and challenges. For nearly 200 years, teachers have been trained to attain what has now become an Associate Degree. Over the last decade, some colleges in the territories have managed to upgrade awards to a Bachelor's of Education.

As an Education Administrator, working among teachers and colleagues in DTE, I have gleaned insights into the issue under study. Through my supervision of schools, observations, and the direct experiences and knowledge as a part-time lecturer in the DTE, I became knowledgeable of the following: CPD activities have not been a regular feature in the TEs' work nor have there been any CPD framework as part of the usual functioning of the DTE.

Within the OECS, the practice of colleges in many cases has been to selectively recruit or hire individuals to fill TE vacancies, because they are perceived as 'good' classroom teachers suitable enough to work in DTEs. This situation is not unique to my context when compared to other contexts. Murray, Czerniawski, and Barber (2011) reported that in the UK, TEs do not usually have doctorates or research backgrounds, but are recruited from schools to fill TE positions. However, these TEs would have to be placed on probation and may be assigned to teaching duties only.

The recruitment of TEs in the OECS on the basis of their professional experiences as school teachers is likely to limit them as academic professionals. The skills, knowledge and attitudes needed to offer quality service for both roles are different. Hence, the assumption that having acquired formal training and have become 'good' as classroom teachers over the years is not enough to qualify them as 'good' TEs. Knight et al. (2014) are of the view that there is no real evidence to support the claim that 'good' classroom teachers make "good" TEs. Relevant CPD activities could help to develop their skills, working as they transition into their

new roles and within their careers. Boyd and Harris (2010) contended that the environment in which TEs work does impact their development. Therefore, they posited that careful attention has to be given to their environmental situation because of failing to provide adequate support, and TEs are most likely to continue functioning as school teachers without developing the practices and identities of academics, more particularly, as practitioner researchers, in HE.

The CPD of TEs in the OECS is critical, since their responsibilities within their roles become pivotal to realizing the OECS vision of "every learner succeeds" (The Organisation of Eastern Caribbean States 2012, 5). The way in which TEs are developed and supported to fulfil their role will impact the standard of teacher education in the region. Furthermore, it will impact our ability to measure up to standards within the global HE setting.

The Ecological Environment of Teacher Educators

TEs develop in an environment that spans what Bronfenbrenner (2005) calls the bioecological environment. However, for the purpose and scope of this paper, I limit my discourse to the Ecological Systems Theory (Bronfenbrenner 2005) where his main focus was on the interrelatedness of context on human development. This ecological environment, he claims, consists of nested structures: micro-, meso-, exo- and macrosystems.

The ecology of human development according to Bronfenbrenner (2005, 107) is:

"The scientific study of the progressive, mutual accommodations, throughout the life course, between the active growing human being and the changing properties of the immediate settings in which the developing person lives, as this process is affected by the relations between the settings, and by the larger contexts in which the settings are embedded".

This position does not ignore the value of the person's development in the equation, but the contextual situation will be the main focus alongside the development of the TEs and how the OECS context promoted and/or hindered their development. It is important to understand what these four ecological systems are, and how their interrelatedness affects the development of the TEs when the theory is applied to their context.

Bronfenbrenner (2005, 148) defines the microsystem as a "pattern of activities, roles, and interpersonal relations" that the person experiences in "a given face-to-face setting with particular physical and material features and containing other persons with distinctive characteristics of temperament, personality, and systems of belief". This means that the

developing person interfaces with like-minded persons within specific settings that contribute to their development. TEs are considered to be in the microsystem, interacting with fellow TEs, through activities, relationships and tasks that will aid their development.

The mesosystem includes several microsystems, for example, TEs interacting with schools; TEs interacting with other TEs within their faculty and/or other faculties in their institutions; and TEs interacting with other educators from other disciplines, institutions and affiliations.

The exosystem which is the third layer operates with connections between mesosystems but with indirect connections and processes that affect the developing person. For example, these interactions may include the decisions made by administrative staff, planners and policy makers that affect the development of TEs.

The final system is the macrosystem which is the infusion and collective integration of the various systems interacting with the wider cultural, social, political and economic milieu. These collectively play significant roles throughout the ecological systems, but may occur in different degrees at given times. Figure 1 shows how the ecological environment is structured.

The value accorded to CPD in the TEs' ecological environment?

Several issues, whether they are enablers or barriers, may influence the degree to which the individuals or groups within the ecological environment value CPD. Values are ideals that regulate or influence behaviours (Giddens et al. 2018). This variance will result in the TEs and other individuals each perhaps having different perspectives of CPD depending on where they sit in the ecological environment and experience that they may have had. The values that they each hold would define the quality of interactions and growth within the various systems that would either enable or impede the TEs' CPD. However, it would be fair to expect that the members in the micro-, meso-, exo- and macrosystems would collectively aspire towards the same outcomes—a sound education system.

Enablers and barriers to teacher educators' CPD

The cost of producing quality TEs should not be taken lightly if we are to endorse Goodwin's et al. (2014, 284) view that "Quality teacher education relies on quality teacher educators". TEs are, therefore, expected to spend time to continuously update their skills and knowledge to remain "top-notch in their profession and do justice to society" according to

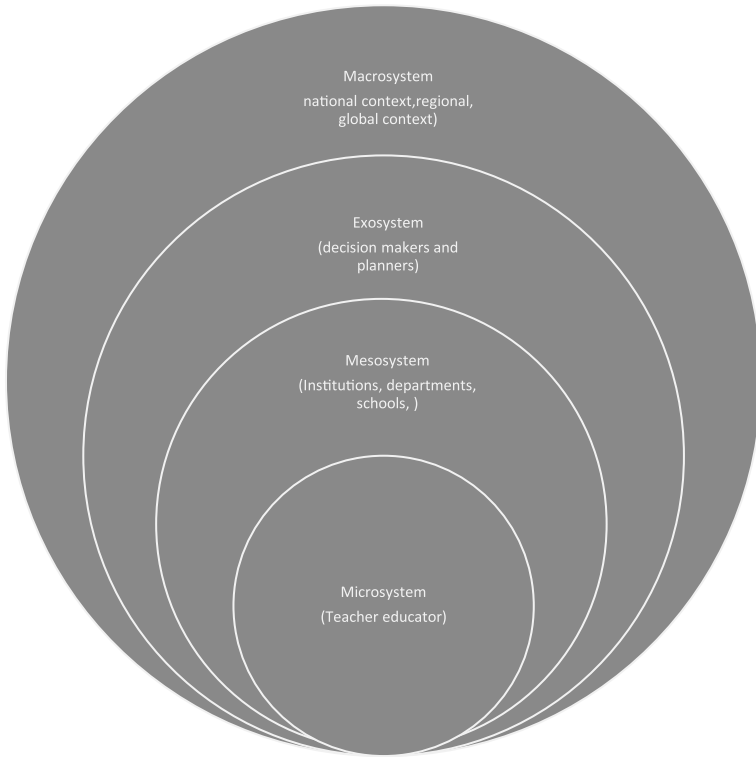


Figure 1: Nested systems within an ecological environment

(Srinivasacharlu 2019, 30). This may be costly for TEs, education leaders and governments that are responsible for the proper functioning of the education system, in general. Although Dean, Tait and Kim (2012) claimed that CPD may result in a decrease in resources to include time, finances and effort, individuals, institutions, governments and policy makers should not be negligent in investing in this important area of the TEs' professional learning. Ultimately, the ramifications for failing to adequately prepare TEs with appropriate CPD activities at induction and throughout their careers in their role of educating teachers would bear enormous long-term costs (Antonio 2019). Antonio (2019, 60) further posited that "the outcome of resources invested wisely in the TEs' CPD since they sit at the apex of our education system, will more likely result in favourable student achievements as an outcome".

Economic-based incentives could motivate TEs to participate in CPD. Salary is one such incentive that sixty-one percent of participants in Hwang's (2014) study claimed promoted TEs' CPD. In another study, Griffiths et al.

(2014), one participant expressed that she targeted CPD opportunities that led to promotion and recognition. Such incentives attract participation, but must be carefully structured and monitored to reap the desired outcomes.

Senior managers who gave positive support and encouragement were considered as an enabling factor for CPD (Griffiths, Thompson, and Hryniewicz 2014). This type of support would include coaching, offering feedback, offering advice on how to navigate the terrain for professional development opportunities, recognition and promotion. In addition, colleagues who have a strong research background could participate in collaborative research ventures to guide and to build TEs' skills. Another type of support was feedback from assessments. In Hwang's (2014) study, TEs' improvement was said to be linked with assessments. Such assessments could identify what specific professional needs that TEs have or whether CPD activities have been effective. However, we must give thought to Smith and Welicker-Pollak's (2008) caution about how these feedbacks are gathered and used. If they are not used as intended, tensions may arise among TEs and management making the exercise futile.

Livingston (2014) suggested that supportive cultures in which TEs work could result in increased self-confidence and improvement in other areas of their work. Zeichner (2005), who outlined his story of becoming a teacher, explained how he was able to benefit from a supportive collegiate culture, as he developed in the Teacher Education field.

Whatever the enablers or barriers that influence TEs' engagement in CPD, they could lead to the development of worthwhile policies in support of TEs' CPD if not already in place. Furthermore, adjustments may need to be made to strengthen existing policies.

Methodology

An MMR was conducted with an exploratory sequential QUAL-quan design to gain in-depth understanding of the phenomenon. The Ecological Systems Theory (Bronfenbrenner 2005) was used as the theoretical framework. Two research questions were formulated for the purpose of fulfilling the aim of the study.

Research aim and questions

Research aim:

The aim of this research was to gain the participants' (TEs and education leaders) perspectives on what factors they perceived promoted or hindered TEs' CPD and how these were manifested.

Research questions

What factors within the ecological environment (micro-, meso-, exo- and macrosystems) do the participants perceive promoted or hindered the TEs' CPD?

How were the factors manifested?

MMR approach and design

MMR which is now considered the "third major research paradigm" (Johnson, Onwuegbuzie and Turner 2007, 112) combines qualitative (textual) and quantitative (numerical) data in a single research project. At the same time, the strengths in each approach are used while addressing their limitations (Creswell 2014). MMR studies allow for deeper understanding of a phenomenon by combining data from both perspectives when arriving at findings and conclusions.

To thoroughly explore this phenomenon, an exploratory sequential Qualitative-quantitative (QUAL-*quan*) design (Creswell 2014) was then selected. In a sequential explanatory design, the qualitative phase is the core component and has greater weighting, while the quantitative phase is the supplementary component (Creswell 2014). Since not much was known about the CPD of TEs working in the ecological environment of the OECS, it was more appropriate for me to use a design that would allow for an opportunity to gain firsthand information from participants through semistructured interviews (Phase1). The information was then used to inform and conduct a survey (Phase 2) with only the TEs, to further probe pertinent issues that arose in Phase 1. Analysis and interpretation of findings occurred at each phase. However, integration of the data from both phases took place at discussion and reporting of the research. The core component formed the "foundation for the results" and the supplementary component "embellished" with the additional details (Morse 2016, 14). This strategy allowed for continuous triangulation, complementarity and development of the research (Bryman 2006); hence, confirming and disconfirming of the issues were possible (Creswell 2014).

An MMR approach using a sequential exploratory QUAL-*quan* design contributed to the veracity of the research (Antonio 2019). Figure 2 illustrates the MMR sequential exploratory QUAL-*quan* process.

Participants

Participants who could provide information about the phenomenon were considered and selected using various sampling techniques.

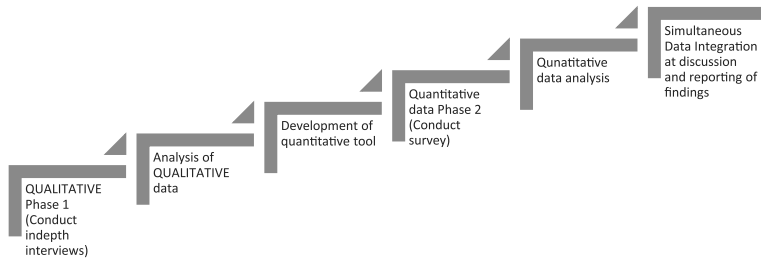


Figure 2: Sequential exploratory QUAL-quan design process

Table 1: Characteristics of sample for Phase 1.

Sample	Research participants by gender	Number of years in the position by territories (Each letter A–E represents a different territory).			Number of participants
		1–3 (initial career)	4–6 (mid-career)	7 and over (advanced career)	
6 of 53 Teacher Educators	*Not applicable	0	A	B	2
	*Not applicable	C	D	D, E	4
3 of 5 individuals in the mesosystem (M1)	*Not applicable	0	C	0	1
	*Not applicable	0	A, D	0	2
3 of 5 individuals in the (Macrosystem (M3)	*Not applicable	D	C	0	2
	*Not applicable	A	0	0	1
1 individual Macrosystem (M4)	*Not applicable	Not applicable	Not applicable	Not applicable	1
1 individual in the exosystem (M2)	*Not applicable	Not applicable	Not applicable	Not applicable	1
Total number of interviewees					14

*Gender not applicable and not indicated to preserve identity

Sampling is a very important step in doing research. Considerations had to be given to the characteristics of the target population, its accessibility, how the data will be analyzed and the time taken to conduct the research (Leacock, Warrican, and Rose 2009). There were two main groups comprising of six (6) TEs from five OECS territories and eight (8) education leaders from different ecological levels in the five territories used in the research. To help arrive at these selections, maximum variation sampling technique (Maykut and Morehouse 1994) was first employed to gain the best variances within the sample used in Phase 1. In so doing, I had to ensure that this technique included samples from each territory and the various ecological systems. Stratified purposive sampling (Collins et al., 2007; Rossman and Rallis 2012) was then used in each stratum to gain representativeness (Collins, Onwuegbuzie, and Jiao 2007) in each level. For example, the TEs were grouped by their years of experience, as shown in Table 2 below.

In Phase 2, the entire TE population (N = 53) was invited to participate in the survey, since the population was already small for a survey. The subset of the six (6) TEs from Phase I was also used. Table 2 outlines the characteristics of the Phase 2 population.

Owing to the small sample in both the qualitative and quantitative phases, generalizations of findings and interpretations would be limited only to the research context (Collins, Onwuegbuzie, and Jiao 2007).

Data collection

In Phase 1, semistructured interviews were used at each ecological level. I was inclined to use interviews as my first choice to collect data, since

Table 2: Characteristics of sample-Phase 2 (n = 28 of 53).

Gender	Male (n = 7/25%) Female (n = 21/75%)
Years as a TE	Initial—1–3 years (n = 3/10.71%) Mid-career—4–6 years (n = 3/10.71%) Advanced 7 years and over (n = 22/78.57 %)
Qualifications	Bachelor in subject discipline (n = 21/75%) Bachelors in Education (n = 8/28.57%) Teacher Ed Cert/Dip (n = 28/100%) Masters in subject discipline (n = 13/46.43%) Master's in Education (n = 7/25%) Doctoral Degree (n = 3/10.71%)

qualitative researchers use interviews more readily to gather data (Creswell, 2003) and the technique allowed for prompts and probes, especially with not much known about the phenomenon. The TEs were first interviewed, and subsequent interview schedules were constructed based on previous information from participants in the different ecological systems. I used critical friends to provide feedback throughout all four successive stages of drafting and modifying my various interview protocols, since the sample population in each group was limited. The critical friends included persons who were educators with masters and doctoral degrees, and my primary and secondary research supervisors. I chose to use virtual means to conduct the interviews because of geographical issues, cost, and time limitations. Three means were used: Skype (being most popularly preferred among participants), WhatsApp (phone), and the telephone, in two cases. With the advent of the internet, researchers have been increasingly aware of public use of this medium in sending and receiving messages and in its value for data collection (Mesch 2012).

In Phase 2 for the survey, I administered a questionnaire with the use of an electronic software (Survey Monkey) to gather data rather than using the telephone, postal surveys, and face-to-face because of geographical boundaries, expense and time constraints. In addition, it is claimed that electronic means yield better response rates, easier data handling than data collected face-to-face by the researcher (Gorard 2001). At the end of two weeks, fifty-eight percent of respondents completed the questionnaire which is a satisfactory response rate for surveys since it is over fifty percent, according to Cohen, Manion, and Morrison 2007.

The questionnaire was piloted with critical friends, my supervisors and/or persons of similar characteristics to the population, to reduce or eliminate ambiguity, and redundancy while improving readability and other issues outlined in (Cohen, Manion, and Morrison 2007).

Data analysis

The qualitative data were analyzed using thematic analysis (Braun and Clarke 2008). Braun and Clarke's six-step process offered more flexibility and clarity as I considered how my data should be analyzed. With several levels of interviews and similar lines of questions, I opted to extend my analysis beyond simply applying a theoretical treatment of the data, but additionally incorporated an inductive approach. Given the small size of the group of TEs in the OECS, nonparametric data as described by Cohen et al. (2007) was derived from the questionnaire in Phase 2.

I analyzed the data using simple descriptive statistics, such as frequency distributions, and graphical summaries.

Ethical issues

Ethical clearance was approved by the University of Liverpool Ethics Committee after I satisfied the rigorous review process. This process included gaining access to the institutions by directly communicating to the relevant education leaders; seeking and gaining informed consent from each participant. At interview, I sort permission to audio tape participants' responses, assured anonymity and confidentiality before data were collected. The data were kept in a secure location, transcribed and sent to interviewees for review for accuracy. Other ethical guidelines advocated by the American Educational Research Association (2011) were observed throughout the research. With Creswell's (2014) claim that cultural, personal and historical experiences would influence a researcher's interpretations, I was mindful that my emic and etic positions (being the researcher and an educational leader) could impact my interpretations of the research. I, therefore, took the necessary ethical steps to limit any bias that could distort the credibility of my research.

Findings

Anonymizing participants

The participants were disaggregated in the following manner to represent the various ecological levels: TE (Microsystem), M1 (Mesosystem), M2 (Exosystem), and M3 and M4 (Macrosystem). Numbers following each respondent represent individual respondents in each ecological level and page number of their quotes in the transcripts. For example, TE1/7 means Teacher Educator 1 (of six participants), page 7 from their transcript. M1-3/7 would mean the third labelled respondent in the mesosystem, page 7 of that transcript. M2 represented the participant in the exosystem. M3 (three participants) and M4 (one participant) were kept distinct, since the two groups represented different and distinct roles in the macrosystem.

Identification of themes and main findings

In answering the question about the factors that promoted and/or hindered TEs CPD, two themes were identified and named after coding and categorizing the data: perceptions of CPD and support for TEs' CPD. Participants in the ecological environment from Phase 1 each

had differing perceptions of CPD which suggested the presence of a weak CPD culture generally. Most survey respondents (n = 19) supported this finding. There was evidence that support for the TEs' CPD was lacking and this caused problems for the CPD of the TEs.

Perceptions of CPD

There was resistance noted among TEs when expected to participate in CPD that were arranged for them. M1-3 noted that there was "resistance when it comes to trying to get persons (TEs) to attend professional development" (M1-3/18).

One TE in mid-career stage (4-6 years) even after attending a session for curriculum review, which was organized by the regulatory board, did not classify the experience as a CPD activity. TE2 interpreted CPD differently:

"Those sessions that were organized to revamp the curriculum and to look at the whole course outlines for the various courses, I don't know one can truly call them that- CPD, because that does not define, to me, CPD." (TE2/11)

This reasoning infers that participating in an important exercise of this nature does not qualify as a CPD perhaps because the sessions were arranged for transmissive purposes. Rather, the TEs were leading the process, exercising autonomy and offering suggestions for improvement for courses that they taught.

There was lack of consensus about what is CPD between the microsystem and mesosystems within the DTE. As evidenced, TE6/7 claimed that there was no "structured programme for continuous professional development at the college". However, M1-2 spoke about how they worked together in their department in meetings and staff discussions during teaching practice to discuss to arrive at amicable solutions to get the job done as evidenced in this comment "this is something we engage in a lot...go through the rubric sent out by JBTE; have our battles; settle these...so we can apply the instrument...it helps a lot" (M1-2/9).

Further up the ecological level, it was expressed that there were critical workshop sessions that were held to provide further training for TEs at specific times on the regulatory board's calendar. M4 expressed that:

"We have these Board of Studies meetings and even in the Board of Studies meetings we look at curriculum, amm slash pedagogical meeting... it is really designed to be a workshop situation where you come in give teachers who are already trained further training in areas that we, we may deemed (sic) to be important for them to have. So, in that

regard officially, the JBTE supposed to engage teacher educators in ongoing training and these are supposed to be held every year between November and January." (M4/5)

Another disparity about how CPD is viewed is evident by the absence of a system to document what activities were done, since activities were "not formally documented as professional development" (M1-2/9). Activities to include, travelling to regional meetings, reviewing and working on assessment strategies were not considered as CPD. There seems to be a tendency to disregard informal CDP and recognition was given only to formal CPD activities at a set time annually. M1-3/4 explained that at that institution "... we don't get enough or we don't do enough in terms of professional development ... there is a block period set aside by the college where all facilitators are engaged in professional development ... once annually".

CPD at the macrolevel was recognized and TEs were remunerated only for those that were award bearing. This was a general trend at the macrosystem-Ministries of Education. "I think basically anything [professional development activities recognised by the MoE] that you would have been doing over a year in duration must be a course that is over a yearlong and you can be and depending on the level of teacher that you are, you can be recognised for it". (M4-2/8)

CPD was further clarified by the possible number of hours annually that each TE should complete, but this too was not yet established in the OECS as evidenced by M3's comment:

"There is a gap. While in the OECS sector strategy we speak to a minimum of 12 to 18 hours of continuous professional development for teachers, it does not specifically include teacher educators. ... We need to get it clear, what are we exactly referring to, when we make reference to continuous professional development. ... So, what we are hoping to do is to put together a list. Because a course that may be accepted in island X for CPD may not be accepted in island Y. So, we need to harmonise this." (M3/5, 6)

From these expressions, the variances in CPD perceptions and interpretations occurred throughout the ecological system. Hence, CPD was not clearly defined or collectively understood.

Support for TEs' CPD

Views about who is responsible for TEs' CPD were mixed and could be linked to the level of support TEs had received and from what sources over the years. There was a general consensus that TEs should receive support from various stakeholder institutions such as their colleges and

ministries of education. However, there was some variance in the level of support to be given. For example, five of six TEs who were interviewed believed that they were responsible solely for their CPD. For example, TE6 declared that: "I have to take responsibility for my own growth and development. ... If I wait on the institution, I would become much stagnated I think probably the institution will have a big say in probably assisting with finance". (TE6/12)

Yet, it was expressed by M1-3 that if the TEs were unable to provide for their own (formal) CPD, then "where support was not forthcoming, the institution itself should ensure they fill the gap to some extent" (M1-3/5). However, with the TEs being cognizant that they needed to keep pace with "new teaching methodologies" (TE2/10), "be on top of my game" (TE6/7) and "empowering myself" (TE3/17), the TEs had been self-directed in their professional learning with some support from sessions arranged by the Regulatory Board to satisfy their teaching demands.

For their own growth and development, M4 explained that: "If you have teachers passionate about what they do and they see their professional development as critical to their own growth then I think that the teachers should take... 75 percent of the responsibility ... the other 25 percent should come from principals or their leaders in terms of facilitating them ..." (M4/7)

In Phase 2, when TEs were asked about the likely sources that initiated their CPD, most of the TEs (n=20) indicated that they should be responsible for their CPD and (n=24) considered themselves to be the likely source to provide for their CPD. At the time of data collection, three (3) TEs in Phase 1 were fully funding their postgraduate studies. However, TEs in Phase 2 indicated that their DTE (n=16) and the Regulatory Board (n=19) were clearly sources that they could rely on for support which is also consistent with the response in Phase 1. The TEs (n=15) felt that their institutions/colleges were sources for support, while others (n=10) were not of this view. Fourteen (n=14) TEs were of the view that UNICEF/UNESCO were likely to be supportive. Only a few TEs (n=8) were of the view that the Ministries of Education would be likely avenues of support. The EDMU (which most TEs in Phase 1 claimed was not known to them), regional associations, partner universities and NGOs and the private sectors were not likely to support their CPD. Figure 3 illustrates the TEs' responses to the question on likely sources of support.

The resistance displayed by TEs in participating in other CPD activities was perhaps not because of their perceptions of CPD. There were no economic benefits to be gained. M1-3 further stated that:

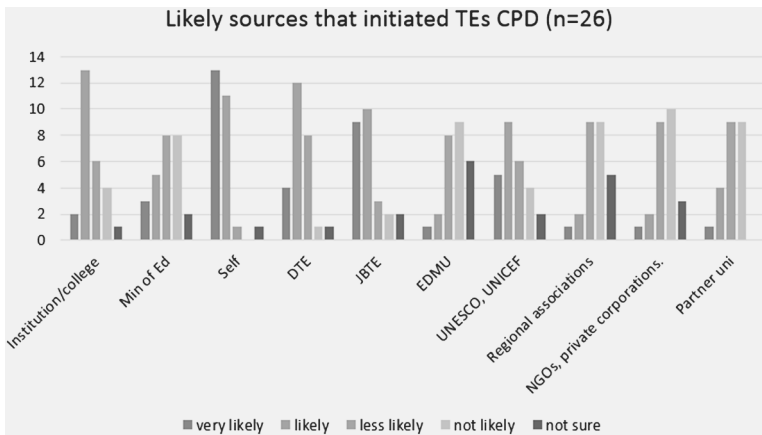


Figure 3: Likely sources that initiated TEs CPD

Not having the funds to do what needs to be done and not knowing they can access free professional development There is no economic value [meaning in non-award bearing activities] ... because you are not being paid according to the number of professional development sessions that we are engaged in ... and we give them [meaning TEs] a certificate and they asked me what is the currency ... When it comes to the government saying that if you have to show your professional development certificates for a raise in pay then they will do it. (M1-3/23)

In the survey, except for one respondent, all other TEs (n = 25) felt that whether or not they received incentives, they should still participate in CPD activities. In some ways, this view does not translate into findings from Phase 1, because it was reported that TEs offered resistance to participate in CPD that were not financially or otherwise rewarding.

It appeared that colleges had limited budgets and would organize low-cost CPD activities. For example, TE5 explained that the seminars would be: "an all-around thing" ... 'cause there are a lot of us. They can't cater to each person's needs in one seminar, so they just do something general" (TE5/9). There was displeasure about the level of support from colleges. TE2 was emphasized that as TEs, they should be at "the cutting edge of developments in teacher education" (TE3/10) with more support coming from their institutions to allow for this to happen. Other forms of CPD activities were scarcely offered such as opportunities to "attend conferences overseas...to stay close to what other persons are doing in the discipline" (TE5/9), but financial support was not forthcoming from their institutions or the government for these activities. M3-4, however, placed

the responsibility on TEs to join professional organizations such as "AERA and ASCD"; forge linkages with the local community, MoE and private sector. M3-4 remarked that: "it is critical for the TEs to recognize that networking is key" (M3-4/6).

At the macrosystem, M3-2 thought that without incentives from the system, TEs may not be intrinsically motivated to engage in CPD activities if these were not recognized and remunerated even at the doctoral level. M3-1 suggested that professional development hours should be tied to salary and that this could be a motivation for them to participate.

The M1s, as departmental administrators, should have some influence in guiding and securing CPD activities for the Department. However, when asked about funding for CPD activities, M1-2 claimed that:

"I have not seen a willingness on the part of the college to subsidise, even to finance such [meaning to attend conferences]; ... have a specific timeframe allocated where the college puts on certain things for teacher educators ... bringing someone from overseas in... to minimise costs; opportunities now available online that is free of cost to you ... what value does it (free online courses) have... some may discard it as not valuable" (M1-2/9, 10).

In the exosystem, M2 recognized that more support was needed for the TEs through "increased opportunities for scholarships... partnerships with friendly governments... small research grants" (M2/11).

M2 suggested that Tax breaks from governments through national banks and credit unions could be used to assist the TEs. These types of approaches would be less expensive and would create greater access for TEs' CPD. Other barriers for TEs' CPD were communication and coordination issues. According to M2: "There is a gap at the national level between the national colleges and the Ministries of Education; ... we get to the regional, the country reports; ... not much is being reported on initiatives that are undertaken at the national level". (M2/4, 5)

The issues raised in the interview brought M2 to the realization that not enough focus has been on TEs' CPD at that level. M2 expressed that: "... now that we are having this discussion, it's bringing it to me that we have been focusing so much at the lower levels [meaning early childhood, primary and secondary teachers] that we have left out this group [meaning the TEs]. (M2/5)

M4 within the macrosystem claimed that Regulatory Board of Studies meetings were held regularly to address the TEs' needs in curriculum, latest methodologies, strategies and techniques. However, M4 believed

that colleges and governments needed to support the TEs when these meetings were being held, since "a lot of people can't come because they can't afford it" (M4-/12). The costs also prevented some education leaders from signaling to some degree, the value they placed on education. M4 was forceful in expressing that the economic issues from "higher" up the system (macrosystem) affected everyone in education.

Discussions

The TEs in the OECS function in a context that has several factors that are mainly hindrances to their CPD. The factors will be discussed in light of the economic, political and sociocultural conditions that exist within the ecological context. These systems must work in harmony in an interconnected way, as shown in Figure 4. First, attention has to be given to the mixed interpretations about what is CPD.

Clarifying the CPD concept

The CPD of TEs has been neglected over the years and this could account for the lack of clarity. However, if the concept remains elusive, there will continue to be mixed signals among the TEs and educational leaders who must plan for such activities to impact TEs' professional lives. Hence, members in the ecological system need to gain clarity and a common understanding of

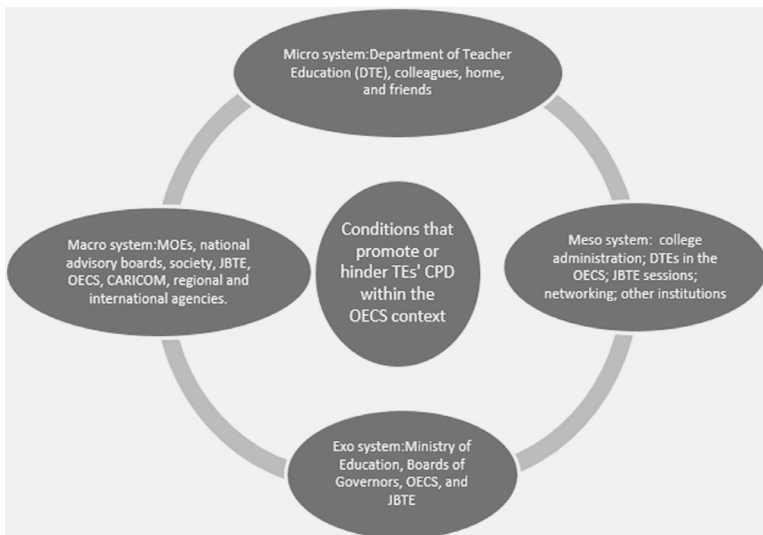


Figure 4: Interconnectedness of the ecological systems

this very important concept, so that a clear vision or mission is set for the TEs' CPD. According to Masoumi, Hatami, and Pourkaremi (2019), CPD enhances learning once applied resulting in improvement. This belief resounds with the Ecological Systems Theory (Bronfenbrenner's 2005) that human development can occur only when the (CPD) activities are continuous, stable and get progressively complex over time. Therefore, the forms, types and purposes of CPD can best be identified, embraced and pursued if a clear CPD framework created and implemented.

Economic factors

CPD can be an expensive venture, draining resources according to Dean, Tait and Kim (2012). The OECS territories are small developing countries with scarce resources that have suffered from the global financial crisis of 2007–2008 and other shocks such as natural disasters ("Organisation of Eastern Caribbean States Systematic Regional Diagnostic" 2018). The economic situation of these territories makes it difficult to invest heavily in education and by extension, in the CPD of TEs. The complaint of limited funds and meagre budgetary allocations for CPD would pose challenges for institutions that wish to expend more on CPD. Leibowitz et al. (2014) in their study claimed that funding is needed to make professional development accessible, to improve teaching and to conduct research among other useful activities within the institutions.

The financial challenges are occurring at each level of the ecological system. For example, TEs in the microsystem look to their college to fund their travel expenses to conferences; colleges which are located in the mesosystem are forced to engage in one-size-fit-all CPD that are low cost; the exosystem wants to see more efforts by governments to give tax breaks so private establishments may assist TEs more readily. However, investing in TEs' CPD is worth the effort when one considers the repercussions of not providing it at all (Schleicher 2012). Antonio (2019, 156) has urged the education leaders in the macrosystem and exosystem of the OECS to "recognise that injection of financial support in ways that will foster the TEs' CPD is critical". Failure to respond to this need for TEs' CPD could result in growth that is less than desired for the TEs and the education sector, since quality TEs are needed for quality teachers (Goodwin and Kosnik 2013). They are makers of future teachers (Srinivasacharlu 2019).

Political factors

The Regulatory Board for the teacher education programme was the most influential in catering to the TEs' CPD. Its influence in engaging the TEs is

several kinds of CPD at different times in the year and the responsibilities it has to ensure that standards are maintained in the programmes makes it a useful source of TEs' CPD. It is perhaps because of its regulatory function that it could attract the TEs to its meetings, although financial constraints may prevent them from attending as regularly as they should. The regulatory body may also be addressing their most immediate short-term course needs and this may be the catalyst that causes the TEs to remain open to participating in its CPD activities. Similarly, the Board is comprised of different stakeholders across the education sector. Their presence on the Board, if they are clear on the CPD needs of TEs, would more likely increase the chances of ensuring that finances and opportunities are made available for their development. Governments are to known to have special interests in its education sector.

Sociocultural factors

For learning organizations to grow and develop, the concept of team learning, proposed by Senge (1990, cited by Bess and Dee 2008, 697) as one of the five disciplines is important. Team learning has been identified to guide organizational learning, could help to reduce the disjointed planning and communication issues that currently occur between the ecological systems which in turn affect the development of education in the OECS. Interactions within the ecological environment have to be bidirectional and frequent (Bronfenbrenner 2005); such interactions will augur well for good collaboration and sharing among the micro, meso, exo and macrosystems on matters pertaining to TEs' CPD.

According to the British Council (2018), TEs develop in four stages such as foundation, engagement, integration and specialization. Although TEs have agreed that they should be responsible for their CPD, support from others in the ecological environment through various CPD activities at different stages in their careers is, therefore, needed. Thomas, Harden-Thew, Delahunty, and Amelia (2016) provided a differentiated professional development framework comprised of multiple options for teaching in HE institutions according to their needs. Their idea provides guidance about how we can structure a professional development framework suitable for TEs given their stages of development and needs. Furthermore, proper planning and execution of educational goals and collaboration with others in the ecological environment are essential. "Education leaders and TEs who are grassroots leaders in the field must now recognise the need to change practices through mindsets that foster greater development of teacher education in the region" (Antonio, 2019).

This level of change should occur at an individual level where TEs seek ways to develop their skills and knowledge and values as TEs. This mindset would involve participating in CPD activities of various kinds and for different purposes depending on needs (individual and institutional).

Conclusion

The factors promoting and hindering TEs' CPD are mainly economic, political and sociocultural in nature. The concept CPD is not clearly articulated in the ecological environment and this needs to be clarified. Manifestations of enablers for TEs' CPD were realized through limited means. There were more incidence of barriers to the TEs' CPD. Funding for CPD was practically nonexistent as institutions in many cases were unable to assist TEs or organize meaningful CPD for TEs development. Lack of funding and budgetary allocations impeded the ability of institutions to be represented at critical meetings and to make allowances for their TEs to attend conferences and other useful forms and types of activities that satisfy different purposes. Without adequate funding, it would be foolhardy to expect that TEs would develop, as they should. Planning and coordination within the ecological environment have been inefficient and needs attention if our general education system is to improve.

With the apparent lack of interconnectedness in the ecological environment, education leaders need to acknowledge that changes are needed. If TEs are to prepare quality classroom teachers for our schools, then quality attention to their CPD is paramount for this to be realized in the OECS.

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Factors Affecting Students' Use of a Select Academic Library in a Polytechnic Institution in Jamaica: A Mixed Methods Case Study Research

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Abstract

The polytechnic library has a unique place among the various academic libraries in Jamaica, and like many others has invested in a variety of resources to cater to the needs of its users. Despite the investment, there seems to be low usage by students and lecturers. As such, this study aimed to identify the factors that affect students' use of a polytechnic library. The study was guided by the following objectives: to determine the frequency of use; to ascertain the factors that impact students use or nonuse; to ascertain the extent to which lecturers' instructional activities include and/or promote the use of the library's resources by students; and to examine the challenges faced by students in using the library. The target population included staff and students of a polytechnic institution located in an urban centre in Jamaica. Using a mixed methods design, both questionnaires and interviews were used to collect data. The findings highlight factors such as socioeconomic indicators, user satisfaction, low reading levels of students, lecturers' limited use of the library resources in the preparation and execution of class activities, and inadequate resources as deterrents to the use of the library by students. The study recommends the establishment of a library committee to oversee the development of a strategic plan for the library. This plan would include developing the collection, acquiring additional ICT resources, marketing the library services and a programme for the teaching of media and information literacy.

Key words: polytechnic library; academic library; user satisfaction and information seeking behaviours; Jamaican polytechnic library; Caribbean libraries.

Introduction

The polytechnic, a new addition to the education landscape in Jamaica, is a multidisciplinary institution that offers low-cost access to “diverse market driven programmes ...geared towards aligning workforce with industry” (Beecher 2015, 11). It is particularly geared towards “unattached” youths and unemployed adults in Jamaica. The polytechnic is considered a strategy to address some of the social and economic issues that exist within marginalized communities as outlined in the Marcus Garvey Manifesto of 1929 (Plank No. 11). These social issues include high crime and violence, poverty and unemployment. Jaffe notes that learners living in such an environment are more likely to have reading and learning challenges, as they are not from literary homes (2019, 382).

The introduction of a polytechnic institution is expected to lead to “rapid economic and [social] transformation in Jamaica and the Caribbean” by providing educational opportunities as well as certification in the various technical-skilled jobs to meet workforce demands (Ministry of Education, Youth and Information 2018). Doern (2008) defines a polytechnic as “a tertiary or higher education institution which offers diverse courses of continuous education in technical and vocational training” (2–3). The West Polytechnic College (a pseudonym used to provide anonymity to the institution) is a site through which institutions such as the Council of Community Colleges of Jamaica, Edna Manley College of Visual and Performing Arts and HEART Trust NTSA offer programmes. These programmes are not static, but change based on job market demands. Learners are trained in technical vocational areas and are equipped to work in various service jobs such as customer service, allied health care, restaurant operations, barbering, computer servicing and electronics and cake baking among others.

Academic libraries, including those in polytechnic institutions, are considered the “hub of scholastic attainment as they play a central role in the academic activities of their parent institutions” (Rao 2011). In polytechnic institutions, the library provides curriculum support services and resources to both lecturers and students (Onaolapo 2016; Raby 2009, 3). This is encapsulated in the West Polytechnic College Library’s vision which states that “the library aims to provide adequate resources and information services to the school community..., in order to support the teaching and learning process” (Neville 2017a, 6). The expectation is that through these resources and services, the library will gain usage advantage (Neville 2017b, 4). Steps are being taken to further diversifying

the library's collection and services to meet the demands of its users in this digital age.

Given that the polytechnic library is new to the Jamaican education system, no studies have yet been done on its effectiveness in serving its clientele. This has led to an interest in exploring the library provisions in polytechnic institutions. This study is guided by the following questions:

1. What is the frequency of library usage by students and lecturers of the West Polytechnic Institution?
2. What factors impact students' use or nonuse of the library?
3. To what extent do lecturers' instructional activities include and promote the use of the library's resources by students?
4. What are the challenges faced by students in using the library's information resources?

While much has been written internationally on factors affecting library usage by students in polytechnic institutions, there is a paucity of such literature in the Caribbean. This study will, therefore, be the first of its kind in the Anglophone Caribbean and will add to the regional literature on librarianship. This study could also contribute to the understanding of user satisfaction and library usage, and serve as a guide for college administrators in decision making. Librarians can use the knowledge gained from the findings to inform their decision-making regarding resources and services for polytechnic libraries.

LITERATURE REVIEW

As a result of the dearth of relevant literature from the Caribbean, the literature used for this review was taken from Kenya, Nigeria, Ghana, South Africa, Sri Lanka, United States, Ireland, United Kingdom, India and Australia

Frequency and Purpose of Library Use

Frequency of library visits can be considered important in determining the relevance of a library to a programme of study; however, it is not a reliable measurement for effective and optimal usage of library resources and services. Wells (1995) examined Australian undergraduate students' use of an academic library and postulates that "students frequently visit daily, with 65% visiting at least once a week." However, she reports that "those who visited the library reported the lowest percentage of 'High Usage' of library resources" (126). Shrestha (2008)

agrees, concluding that students may use the library mainly as a place, but may not be aware of the resources. Though students may use the library regularly, there is a difference in the resources used and purpose for use, which may impact the conversation on whether the library resources are considered fully utilized or underutilized by students (Jamil et al. 2013, 33). Tella et al. (2008) explain that more than half of the Nigerian students in their sample use the library to read, borrow books and photocopy, but do not use the library's electronic resources (i.e., ebooks and e-journals), and electronic information services [i.e., library's webpage, Online Public Access Catalogue (OPAC), and online database and Internet] (11). On the contrary, the findings of Fasae, et al. reveal that students visit the library to use textbooks, social media networks and lecturer notes, with a low percentage consulting printed journals and electronic resources (qtd.in Abosede and Ibikunle 2011, 8-11). These results suggest low usage of electronic resources and some printed resources such as printed journals by students of polytechnic institutions.

Factors Impacting Students' Use and Non-use

There are several factors which impacted students' use of the library's resources. These include socioeconomic and demographic backgrounds, students' perception and users' satisfaction (Soria, Nackerud and Peterson 2015, 636). Research shows that additional factors such as gender, age, income level, first generation college students, work status and home situations play a pivotal role in students' use or nonuse of the library. Stone and Collins found that usage rates of e-resources are higher among females than males (2013, 26), a finding supported by Onaolapo (2016, 11) and Soria, Nackerud and Peterson (2015, 637). Abosede and Ibikunle (2011) posit that as the age of students increases, library usage decreases. This shows an inverse relationship between age and library use.

Ester (2017) posits that persons from low socioeconomic background are more likely to have challenges financing their education (14), so the polytechnic model was developed to cater to them (12-13). In addition, Soria, Nackerud and Peterson (2015) postulate that first generation college students from these institutions are more likely to come from a lower socioeconomic family background, and often are employed while attending school (635). Whitmire (2002) discovered that students who work full time are less likely to spend time in the library and use online references compared to their peers (553). This might be attributed to limited time. Soria, Nackerud and Peterson (2015) further state that these students often feel intimidated and lacked confidence in their ability to successfully use

library resources. As a result, these individuals will have a lower chance of knowing how to navigate the higher education institution environment, as they would lack the social capital knowledge passed on from parents who attended college (637). In addition, first generation college students are less likely than their counterparts to borrow and read books, utilize workstations and review content found in academic journals (638). With the many challenges faced by students from lower socioeconomic background, Soria, Nackerud and Peterson (2015) emphasize the importance of the library connecting "students to the right resources and services in an effort to improve library usage and academic success" (642).

Another factor that might influence the use of libraries is user satisfaction, defined as "the satisfaction of people's informed preferences or desires that will impact their demand for goods and services" (Lévy-Garboua and Montmarquette 2007, 3). Library users will keep on demanding and using information resources and services when they derive maximum satisfaction from their use (Yeboah 2018). In general, students perceive the library as a place where their information and research needs are adequately fulfilled and academic work can be done (Jamil et al. 2013, 21). On the contrary, dissatisfaction will result in low usage, as students will believe that the library is not adequately providing for them. This is supported by the findings of Edem et al. (2009), which state that students were dissatisfied due to lack of a proper online library management system, such as OPAC and "disorganized holdings of library materials" (323). Nwali (1990) also reveals that low usage of printed resources by students is a consequence of the library's inability to adequately provide printed resources for all groups equally. Students report unequal distribution of printed resources with those in technical and vocational disciplines being disadvantaged (144). Hence, it could be concluded that libraries which are not meeting the needs of all users will contribute to dissatisfaction among the user groups (Onalapo 2016, 12; Tella et al. 2008, 12-13). This is likely to result in low usage.

Students' information seeking strategies also impact the use of the library's printed and electronic resources. Dean and Durant found that low usage of electronic resources at a community college in Jamaica was as a result of today's students being more familiar with using search engines via the Internet rather than scholarly databases provided by their institution for research purposes (2018). This corroborates the findings of Shrestha (2008) that students prefer Internet resources as its interface is easy to use and they could get unlimited information on the subjects quicker and easier (6). Hence, library users would prefer not to go to

databases with different search requirements and interfaces. This could result in the library's OPAC and databases being underutilized (Dean and Durrant 2018).

Impact of Lecturer's Use of Library Resources on Students' Use

Fister (1992) posits that faculty members play a significant role in guiding their students to the right resources to use (164). Kerins et al. (2004) concur, adding that students tend to take their cue from lecturers regarding all aspects of their information seeking approaches (8). Lecturers visit the library for various reasons, including borrowing resources to prepare for instructional activities. Jamil et al. (2013) report that some library resources were underutilized by lecturers (19) and explain that students visit the library for work related to courses taught and work assigned by lecturers (28-29). Students tend to look for information resources that they see their lecturers using (Dean and Durrant 2018). Therefore, it is important that lecturers and librarians collaborate. Yousef (2010) posits that collaboration between lecturers and librarians, in creating guided search tools and bibliographic listings, is likely to increase library usage by both students and lecturers (7).

Challenges Faced by Students

Students experience several challenges in using the library. Onaolapo (2016) reports that approximately 79% of the respondents in Kwara State, Nigeria, indicate that the librarian failed to sensitize them about the availability of resources. Another 92% state that they are unable to use the electronic resources available to them, due to lack of requisite skills to navigate and access information needed from these resources (10). Desta et al. (2017) point out that "students who lack the required competencies/skills will not be able to effectively use the library online resources and services; thus impacting their library use" (3). This corroborates the findings of Onaolapo who "stressed the need for training and sensitization on the usefulness of electronic resources to students" (12).

Other factors inhibiting library use are a lack of Internet connectivity and a lack of basic knowledge and awareness of the resources (Fasae, et al. qtd.in Abosede and Ibikunle 2011, 7; Tella et al. 2008, 12) and unavailability of electronic resources on mobile platforms (Fasae, et al. qtd.in Abosede and Ibikunle 2011, 5). To further compound the problem,

students still find the process of research intimidating (Pickard and Logan 2013, 403). In addition, there are challenges with inadequate supply of books and other information resources, unawareness of the available library information resources and accessibility issues (Onaolapo 2016, 12). One additional challenge faced by students which impacts their library use is that those with home responsibilities might find it difficult to stay after classes to use the library (Stone and Collins 2013, 31).

Methodology

A convergent mixed methods case study design was adopted for this study with the QUAN-qual model design. According to Creswell (2013, 44) and Mills (2018, 7), this method involves the researcher concurrently collecting, analysing and integrating data from both research approaches, with the quantitative weighted more heavily than the qualitative when interpreting results. This integrated approach allows "for deeper understanding of the research problem than the use of either approach alone" (Mills 2018, 152-153). Quantitative data on students' use of the polytechnic library provided a student perspective on the issue being investigated, while qualitative data from the lecturers provided additional information that when discussed together enabled the researcher to come to a better understanding of students' use of the library. Both perspectives could be obtained only through the use of the mixed methods. The case study design was also used in this study. It allows for in-depth data gathering relating to a single institution for the purpose of learning more about an unknown or poorly understood situation (Leedy and Ormrod 2005, 108).

Participants

The West Polytechnic College, the institution under study, has an enrolment of 170 students: 54% males and 46% females. Only 143 are registered users of the library, so this was considered the study population. These students are pursuing one of the twenty-two technical vocational disciplines offered through the college. The teaching staff is comprised of twenty professionals, twelve of whom are full time, thus making them eligible for participation. The minimum qualification to teach at the West Polytechnic College is a Master of Education in the respective fields.

Considering the number of the registered library users, which is 143 for students and twelve for lecturers, the Israel model was deemed appropriate for sampling. This model stipulates that given a small population of $N=143$, if $\pm 5\%$ is taken for precision level where confidence level is 95%

and $p = .5$, then the sample would be 107 for the student library users and twelve for the teaching population (Israel 5). Based on Israel's (2003) suggestions, 107 students were chosen for the sample in addition to the twelve full-time lecturers (5). According to Leedy and Ormrod (2005), this is suitable for a situation where the stratum groups are unequal, so a representative sample was chosen from each group (203).

Instrument

Both a questionnaire and an interview schedule, which were created, and pilot tested by the researcher, were used to collect data. These were pilot tested on individuals who fit the criteria of the study sample. The questionnaire which was used to collect quantitative data from students comprised twenty-two questions in four parts. The first section which contained eleven questions collected demographic data on students' gender, age, education levels, previous library use and so on. Part 2 gathered data on students' frequency of use, purpose for use and the resources that they utilized. Part 3 of the questionnaire explored the factors which affected library use, while part 4 examined the impact of lecturers' instructional activities on library use. The Likert scale was used to collect information. The interview schedule contained twenty questions divided into four parts, and like the questionnaire the first part contained questions aimed at gathering demographic data. The remaining fifteen questions which were open-ended collected data on lecturer's use of the library resources, instructional activities that influenced the use of library resources and challenges faced by lecturers in using the library resources.

Procedures

In conducting this research, approval was first granted by the University of the West Indies, Mona Ethics Committee, after which permission to conduct the research on the school's premises was granted by the principal of the institution under study. An invitation to participate was extended to students after their names were verified from the library registration list for the various groups. The invitation included an explanation of what the study is about, the purpose, and an informed consent letter, which outlined the procedures for their participation and requiring a response confirming their willingness to participate. It was explained that their participation was voluntary, and that they could withdraw at any time without consequence. Students were then instructed to sign and return the informed consent form. Those who indicated a willingness

to participate received a questionnaire, which they completed and returned to the researcher.

Semi-structured interviews were used to collect data from the lecturers. As such, official correspondence was sent to them asking them to participate in the study. Each participant was contacted to confirm his or her willingness and similar assurance of withdrawal without penalties was extended. Having gained the cooperation of the participants, the researcher gave each a scheduled time for the interview, which both they and the researcher agreed upon. All interviews were conducted within the audio-visual room, a private secluded area of the polytechnic library, conducive to the nature of the interview activities. Each interview lasted approximately forty minutes. Interviewee responses were recorded having sought their permission.

Data Analysis

The quantitative data were analysed using the descriptive statistics package for the Social Sciences (SPSS) software tool, to "transcribe, organize, code, perform statistical tests run and presented graphical data in line with the objectives of the study" (Guedes dos Santo et al. 2017). This process involved using the frequency, descriptive and cross-tabulation distributions of the variables in this study, and displaying data using percentages in summary form. The qualitative data were reread, coded, organized and some tabulated using the SPSS, while the researcher, transcribed, compared and synchronized the data with that found from the survey and presented information in a narrative form (adopted from Onaolapo 2016, 11). The narrative data are used to clarify and support information gleaned from the survey. The themes which emerged from the qualitative data were closely aligned to the research questions.

Data Presentation and Analysis

Questionnaires were administered to 107 students from various programmes over the period of two weeks and there was 100% response rate. In addition, qualitative data were collected from twelve lecturers using the interview schedule. Both qualitative and quantitative data are discussed concurrently in this section.

Demographic Data

Of the 107 participants, 73% are females and 27% are males, representative of the gender distribution of students who use the library, but this contrasts with the gender distribution of the population, which has a

higher percentage of males. The gender imbalance in library use concurs with Abosede and Ibikunle (2011) who state, "as student's population increased by one female, the probability of library use goes up". The majority of the respondents were below twenty-four years, as shown in figure 1.

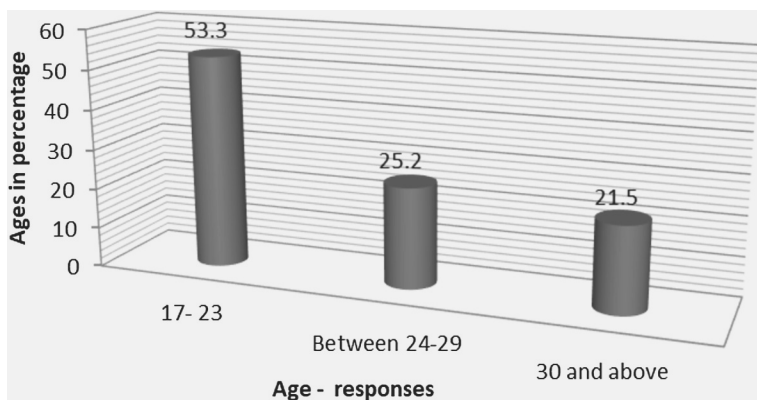


Figure 1: Age distribution of student participants

The numbers of students in each age cohort which use the library are reflective of the numbers in the sample. More than half of the frequent users (53.3%) are millennials.

Based on the responses to the items about where students reside, most of the respondents are residents of marginalized urban communities within the Kingston metropolitan area. Only 10% is from other areas. Eighty-one percent of the respondents attained secondary level school leaving certification, 15% has tertiary-level certification and 4% has only primary-level education. This means that the majority of respondents might have exposure to school libraries, many of which are operating below optimum standards (Shelley-Robinson 2007). Fifty-one percent of the respondents are the first in their family to attend a tertiary institution, and 41% are working and attending school. Although 51% are not working at the time of the study, 41% is still a sizable number who would be less likely spend time in the library. This corroborates with the findings of Soria, Nackerud and Peterson that "students who work ... do not have the time to visit the library physically but, would more likely use online services and resources" (2015, 641). Almost three quarters of the respondents live in households where the main breadwinner earns below the minimum wage, concurring with the need for the polytechnic programme

(Ester 2017, 4). This combination of demographic factors suggests that respondents would have a greater need to utilize the resources of the library, since they lack the financial resources to purchase the necessary texts. Fifty-seven percent of the respondents indicate that they have children, reflecting the findings of Stone and Collins which conclude that students with home responsibilities may find it difficult to stay back and utilize the library resources. These factors combined are likely to result in infrequent use of the library (2013, 31).

Frequency of Library Use by Lecturers and Students

A cross tabulation was done to determine the impact of previous library experience on the current practices of participants. Previous library experience refers to the consistent use of any type of library prior to entering the polytechnic institution. Of the 107 participants, 66% had previous library experience, while 34% did not. The cross tabulation between previous library experience and current library use is shown in table 1.

Table 1: Cross-tabulation of library use and users prior experience.

Library usage experience	Frequency usage				Others	Total
	Daily	More than one day but less than five times per week	Less than sixty days per semester	Don't use		
Yes	17 24%	24 34%	12 17%	18 25%	0 0%	71 66 %
No	8 22%	5 14%	9 25%	9 25%	5 14%	36 34 %
Total	25 23%	29 27%	21 20%	27 25%	5 5%	107 100%

A total of 75% of the participants who had previous library experience are currently library users when compared with 61% of the current users who had no previous experience. Those who reported having prior experience have a higher usage rate as: 24% use it daily and 34% use the library more than one day per week, but fewer than five times per week. This compares to daily use of 22% and weekly use of 14% by those without previous experience. The data reveal high frequency of use among students with

prior library experience. However, the daily and weekly usage statistic is below Wells' 65% weekly usage (1995, 125). A quarter of those who had previous library experience do not use the library. Previous library experience impacts the frequency of library use, but it is not a guarantee of current library use by students.

On the other hand, data collected from twelve lecturers reveal that 16.7% use the library daily, and 33.3% use it once weekly. Approximately 50% of the lecturers are not library users, because they have little time, while at work or they do their preparation from home, as it is more convenient. These figures indicate low usage among lecturers, confirming the findings of Jamil et al. (2013, 19).

Purpose of Library Visits

Students are going to the library, but the major reasons are not to use the library resources. Figure 2 shows students' reasons for using the library.

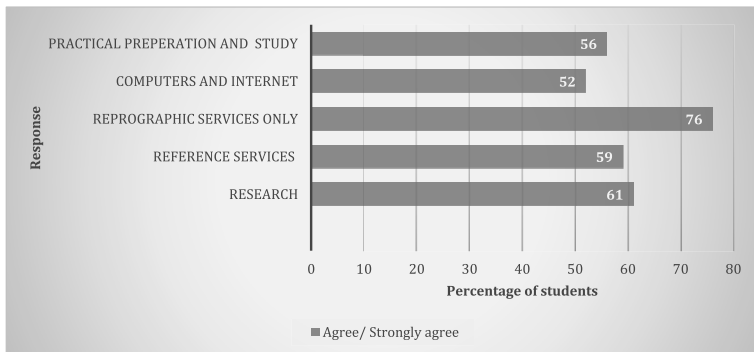


Figure 2: Students' purpose for visiting the library

The most popular reasons for library visit by students are: using reprographic services (76%); conducting research (61%); seeking help from the librarian (59%); preparing for practical sessions and studying with friends (56%); and accessing the computers and Internet (52%). This finding agrees with Tella et al. (2008) who reveal that the "majority of the library users visit the library for educational and reprographic purposes" (14). It could be concluded that students may not be aware of the other resources and services offered by the library (Shrestha 2008, 65).

Respondents were presented with a list of resources that the library provides from which to select the ones that they consult while using the library. Responses are presented in table 2.

Table 2: Resources often consulted by students.

Resources	Responses	
	Frequency	%
Learner Guides	42	39.0%
Course Reserve Books	38	35.5%
Open Shelf Text Books	38	35.5%
Handouts	37	34.6%
Newspapers	19	17.8%
Dictionary	19	17.8%
Fiction Books	17	15.9%
KOHA (OPAC)	15	14.0%
Online databases (ProQuest and Ebscho)	13	12.1%
Encyclopaedia	9	8.4%
Scholarly Journals	9	8.4%
Library Stationeries, that is, stapler, scissors, and so on	7	6.5%

In keeping with the emphasis on the use of the library as a space more so than the use of library resources, the usage of all the resources listed falls below 50%. Printed resources such as learner guides (39%), course-reserved book (35.5%), open shelf textbooks (35.5%) and handouts (34.6%) are the most consulted. These resources are consulted more than the others according to the field of study of the students and the fact that these are written or recommended by lecturers. Components of TVET core curriculum rely heavily on learner guides and course-related texts. This finding corroborated the finding of Nwali (1990), that "students' use of resources is dependent on the relevancy to their course needs" (142).

Only a small percentage of students (12.1%) indicate that they use online databases (ProQuest and EBSCO) and OPAC (14%) when searching for information. This low usage is similar to the findings of Tella et al. (2008, 11) and Fasae et al. (as cited in Abosede and Ibikunle 2011, 8). Some resources such as examination past papers, magazines, e-books, e-handouts and e-journals are not consulted. Findings from previous studies showed that students, who are considered technology savvy, would gravitate towards electronic resources more (Stone and Collins 2013, 25). That finding is not supported in this study. As indicated previously

in this study, students consult the Internet when searching for needed information. Both lecturers and students display a similar trend with regard to resources consulted. Based on the data obtained from the interview, 75% of lecturers report consulting the Internet, and 25% using recommended printed texts from the library when preparing for their instructional sessions.

On the whole, the data revealed that the West Polytechnic College Library is frequently used by students who mainly utilize printed materials and reprographic services. Experienced student users frequent the library more often, but previous library experience was not a guarantee of continued library use. On the other hand, lecturers are not frequent users of the library. Lecturers and students display similar user habits based on resources consulted.

Students' Satisfaction with Library Provision

Students were asked to rate their satisfaction with the library facility, collection and services. Tables 3–5 show the responses.

Table 3: Level of satisfaction with physical facility of the library.

	Physical facilities	VS/S	VD/D	Total
i	Library building design	104 (97%)	3 (3%)	107 (100%)
ii	Location of the library	101 (94%)	6 (6%)	107 (100%)
iii	Audio–Visual Room	64 (60%)	43 (40%)	107 (100%)
iv	Library furniture	56 (52%)	51 (48%)	107 (100%)
v	Reading space in the library	40 (37%)	67 (63%)	107 (100%)
vi	Computer facilities	47 (44%)	60 (56%)	107 (100%)
vii	Internet connectivity and accessibility	23 (21%)	84 (79%)	107 (100%)
viii	Library's opening and closing time	53 (49.5%)	54 (50.4%)	107 (100%)

Key: VS=Very Satisfied, S= Satisfied, VD= Very Dissatisfied, D= Dissatisfied, M= Missing

Most of the respondents (97%) are satisfied with the building design, and the location of the library (94%). Users are moderately satisfied with library furniture (52%), and the audio–visual room (60%). Yeboah et al. (2018) postulate that a library that is “strategically located” is likely to attract a higher number of users (10). However, in this case, high satisfaction did not translate into optimal usage of library resources. Although students’ view of the library as a relaxing environment reflects a positive perception, they may not be aware of all the other resources available to them.

Whereas there are high levels of satisfaction with some facets of the physical accommodation, students are dissatisfied with the following: the lack of a reading space (63%); Internet connectivity and accessibility (79%); inadequate computer facilities (56%); and opening and closing times of the library (50.4%). The level of dissatisfaction is similar to Chauhan and Bhatt's (2017) findings which report that low use of library and its resource was due to students' dissatisfaction with the slow Internet and Wi-Fi connections, and inadequate reading space.

The library collection is integral to the quality of service provided. Students were asked about their level of satisfaction with the collection. Their responses are displayed in table 4.

Table 4: Level of satisfaction with library's collection.

	Library's collection	VS/S	VD/D	M	Total
I	References sources (e.g., dictionaries, encyclopaedias, yearbooks)	68 (63.5%)	38 (35.6%)	1 (.9%)	107 (100%)
Ii	Textbooks	57 (53.3%)	49 (45.8%)	1 (.9%)	107 (100%)
Iii	Periodicals (journals, newspapers, magazines, newsletters)	53 (50%)	44 (41%)	10 (9%)	107 (100%)
Iv	Electronic materials (e-journals, e-books, CD-ROM/DVD-ROM)	46 (43.1%)	51 (47.9%)	10 (9%)	107 (100%)
V	Online databases (ProQuest and Ebscohost)	24 (26.2%)	72 (67.3%)	7 (6.5%)	107 (100%)
Vi	West Indian collections/ materials	67 (62.6%)	39 (36.5%)	1 (.9%)	107 (100%)

Key: VS = Very Satisfied, S = Satisfied, VD = Very Dissatisfied, D = Dissatisfied, M = Missing

Moderate levels of satisfaction are recorded for the library's collection, and this might be a reflection of students' lack of engagement with these resources. Respondents are most satisfied with the library's reference (64%) and West Indian collections (63%). They are marginally satisfied with available textbooks (53%) and periodicals (50%). The levels of satisfaction did not result in optimal usage of all printed resources, as the researchers' earlier findings show that students rarely consult periodicals. Students

express a high level of dissatisfaction with the library's electronic resources. This seems to be an area in which further research is needed.

Students were also asked to rate the level of satisfaction with library services. The results are shown in table 5.

Table 5: Level of satisfaction with services provided by the library.

	Library's services	VS/S	VD/D	M	Total
i	Reference/Information Service (<i>assisting you to locate your information sources</i>)	69 (64%)	37 (35%)	1 (1%)	107 (100%)
ii	Circulation services (<i>lending of library materials to you</i>)	67 (63%)	38 (36%)	2 (1%)	107 (100%)
iii	Exhibitions	52 (49%)	55 (51%)	0	107 (100%)
iv	Reprographic services (<i>Photocopy and printing</i>)	69 (64%)	38 (36%)	0	107 (100%)
v	Library and information sessions/workshops	39 (36%)	68 (64%)	0	107 (100%)
vi	The overall services of the library	54 (50.4%)	53 (49.5%)	0	107 (100%)

Key: VS=Very Satisfied, S= Satisfied, VD= Very Dissatisfied, D= Dissatisfied, M= Missing

Approximately 64% of the participants indicate that they are satisfied with the library's reference/information service; 63% with the circulation service offered; and 64% with the reprographic services. Only 36% of the respondents are satisfied with the library and information sessions. Currently, some programmes do not accommodate sessions for information literacy, and this could account for the low levels of satisfaction. On the other hand, when workshops are held on days that the students are able to attend, they rarely do so. One possible explanation is that seeing that the institution does not timetable them for these sessions, students might not perceive them as valuable. The reported dissatisfaction with exhibitions (50%) and library information sessions and workshop (64%) confirm the researchers' findings that enough is not being done by the library to promote these services. The findings also corroborate those of Mairaj and Naseer (2013) that to "enhance user satisfaction is integral to a successful services...because satisfied users, have positive feelings and recommend the services to others" (2013, 322).

The extent to which lecturers' instructional activities include and promote the use of the library's resources by students was examined and the results are shown in table 6.

Table 6: Impact of lecturers' use of library resources in instructional activities.

	RESPONSES	SA/A	SD/D	M	TOTAL
I	I will only visit the library if my teachers instruct me to do so.	76 (71%)	31 (29%)	0	107 (100%)
II	My lecturer encourages me to use the library's resources and databases to complete assignments and/or research.	69 (64.5%)	38 (35.5%)	0	107 (100%)
III	I prefer to use textbooks, because my lectures only cite from printed text.	66 (61.7%)	48 (38.3%)	0	107 (100%)
IV	I prefer not to use databases, because my lecturer will not grade for diversity in cited sources.	80 (74.8%)	27 (25.2%)	0	107 (100%)
V	My lecturer always cites his or her sources, which I use when doing my research.	43 (40.2%)	63 (58.9%)	1 (.9%)	107 (100%)
VI	All my assignments require going to the library.	26 (24.3%)	80 (74.8%)	1 (.9%)	107 (100%)
VII	When doing assignments or research, I only use textbooks that are on the recommended bibliography list by my lecturer.	13 (12.1%)	93 (87%)	1 (.9%)	107 (100%)
VIII	Resources recommended by lecturers are not found within the library.	65 (60.7%)	40 (37.4%)	2 (1.9%)	107 (100%)

Key: SA=Strongly Agreed, A= Agreed, SD= Strongly Disagreed, D= Disagreed, M= Missing Value

The majority of respondents (71%) visit the library based on lecturers' instruction. This corroborates with the findings of Kerins et al. (2004, 8). In addition, 61.7% of the respondents prefer to use printed textbooks over other resources, because their lecturers only cite from these. One lecturer corroborated the lack of use of databases by students by stating, "When given assignments, students' show no evidences that they consult electronic sources from the library's collection or databases, i.e, ProQuest. This seems to be a case where students' behaviours in terms of the use of library resources mirror that of lecturers as one states, "When I use the library I only consult the text that are made available to us, so I always direct my

students to use those. In addition, the course that I teach does not require students to do much in-depth research, so they are not encourage to use electronic or online database." This confirms the researchers' earlier findings that students and lecturers have similar pattern with the resources consulted.

With respect to the low usage of databases by students, (74.8%) do not consult them. In addition, students' perception of the use of printed and electronic resources is based upon the lecturers' use of these resources in the preparation and administration of their instructional activities, or the emphasis lecturers place on the importance of using these resources when students complete their assignments.

Eighty-seven percent of the respondents will use textbooks and other resources that are recommended by their lecturers. However, 60.7% of the respondents reported that texts recommended by lecturers are not usually found in the library, which may result in 74.8% believing that the assignments given do not require them visiting the library. This supports the findings of Yousef (2010, 12) and Kerins et al. (2004, 1), who contend that librarians and lecturers need to work together.

Further investigation on collaboration between lecturers and the librarian reveals that 92% of the lecturers were not interested in collaborating with the librarian on developing bibliographic listing for printed and online learning resources for their students' use. When lecturers are asked why, 50% said that they do not have the time to do so, 25% said that they see no need to, 17% indicate that they do not think about that option. This confirms the finding of Hardesty as cited in Yousef, which proffered that "faculty members...are not interested in advice from librarians about bibliographic instruction or bibliography listing" (2010, 1).

With regard to encouraging students' usage by lecturers, the findings show that 64.5% of the respondents strongly agreed that their lecturers encourage them to use the library's resources and databases when completing their assignments and conducting research and is supported by the qualitative data as indicated in the responses from two lecturers who supported the idea that students should use the library. One said, "*Libraries play an important role in students' studies and as such I encourage my students to use the library's resources*", while the other agree stating, "*It is important that students use the library as this will enhance their studies, with this said, I encourage my students to use the library's resources.*" Low usage of resources suggests a strong association to lecturers' nonuse of the resources. Shrestha supports this finding by stating a "lecturer who has no library training or who does not utilize the library and its resources is less likely

to encourage or motivate his/her students in the use of the library and its resources" (67).

The data show that the extent to which students will use library resources is greatly dependent on the lecturers' use of the printed and electronic resources in the preparation and administration of their instructional activities and the emphasis lecturers placed on students' use of these resources when completing assignments. In addition, more emphasis needs to be placed on training for academic staff in the use of the electronic resources, and there needs to be continuous collaboration between the librarian and lecturers in creating bibliographic listing and selection of suitable resources. This should help to increase the use of library resources by students and lecturers.

Challenges Faced by Students in Using the Library

The data revealed that students face a number of challenges in relation to the use of printed resources. Although 60% of the respondents indicate that they can effectively use the library and its resources, trends from prior findings in this study, and challenges faced by students show a contradictory result. Table 7 outlines the challenges encountered by students with printed resources.

Table 7: Challenges faced with printed resources.

	Responses	SA/S	SD/D	N	Total
I	Printed books are hard to locate on the shelves.	1 (.9%)	78 (72.9%)	28 (26.2%)	107 (100%)
ii	Texts are difficult to read and understand.	85 (79.4%)	8 (7.5%)	14 (13.1%)	107 (100%)
iii	The information in texts is not relevant to the assignments /tasks given by teacher.	20 (18.7%)	78 (72.9%)	9 (8.4%)	107 (100%)
Iv	Inadequate supply of relevant text needed for my course.	75 (70%)	11 (10%)	21 (20%)	107 (100%)
V	It is hassling to borrow books or to access library materials.	15 (14%)	85 (79.4%)	7 (7%)	107 (100%)

Key: SA=Strongly Agreed, A= Agreed, SD= Strongly Disagreed, D= Disagreed, N= Neutral Value

The majority of respondents (79.4%) indicate that they find printed books difficult to read, and this might be one factor which can impact

library use. Lecturers corroborate, stating that some students are reading below their grade level, so it is difficult to get them to decode the information from some of the textbooks recommended for their courses. As a result, lecturers use alternative sources. One lecturer expressed this concern in the following way, "Students have reading disabilities that may prevent them from consulting text-book required for the course level (those within the library). Therefore, I usually consult others sources that are not available at the library because the reading level is lower." Another factor which contributes to the low library usage is the lack of an adequate supply of relevant and meaningful texts appropriate for each course, as reported by seventy percent of the respondents.

The finding from lecturers confirm that the supply of printed resources is inadequate, and that printed materials found within the library for some courses areas are out-dated and often too general in nature. According to one lecturer, "Resources within the library, especially textbooks are at times out-dated or only one copy can be found within the library, which at time cause lecturers to take their own resources". Another lecturer agreed and noted, "Text books are sometimes too general and do not match students reading level." This corroborates the findings of Onaolapo (2016), which stated that low usage was as a result of "insufficient books" available at the library (9).

Students also experienced challenges with the use of electronic resources, as shown in table 8.

Table 8: Challenges faced with electronic resources.

	Responses	SA/S	SD/D	N	Total
I	Limited amount of computers, so it is hard for me to get to use of one.	78 (72.9%)	28 (26.2%)	1 (.9%)	107 (100%)
Ii	Information found on the electronic database is not suited for my assignment.	47 (43.9%)	43 (40.2%)	17 (15.9%)	107 (100%)
Iii	The information presented on the databases is too text heavy and complicated to read.	65 (60.7%)	14 (13.1%)	28 (26.2%)	107 (100%)
Iv	My assignments do not require the use of databases.	66 (61.7%)	37 (34.6%)	4 (3.7%)	107 (100%)
V	I have little knowledge and skills in to how to use the computer and electronic resources on my own.	51 (47.6%)	50 (46.7%)	6 (5.9%)	107 (100%)

(Continued)

Table 8: (Continued)

	Responses	SA/S	SD/D	N	Total
Vi	I have little knowledge and skills in to how to use the Library's OPAC on my own.	53 (49.5%)	35 (32.7%)	19 (17.8%)	107 (100%)
Vii	It is too difficult to locate e-resources.	49 (45.8%)	42 (39.2%)	16 (15%)	107 (100%)
Viii	I prefer to use electronic resources at home, but they are not available.	53 (49.5%)	35 (32.7%)	19 (17.8%)	107 (100%)

Key: SA = Strongly Agreed, A = Agreed, SD = Strongly Disagreed, D = Disagreed, N = Neutral Value

Seventy-two-point nine percent of the respondents indicate that there are limited number of computers. Approximately 44% report that information found on the electronic databases is not suited for their assignments, while 60.7% state that the information presented on the databases is too text heavy and complicated to read. On the other hand, respondents express having little knowledge and skills in how to use the electronic resources and computer (57.6%) and the library's OPAC (49.5%) on their own. Another 45.8% claims that it is difficult to locate e-resources, while 49.5% would prefer to use electronic resources from home; however, this option is not available.

The challenges cited confirm earlier findings of this study that students have poor reading skills, and the library does not provide access to the resources and the necessary training to use them. The findings are similar to those resulting from the study of Onaolapo, which suggests that the factors relating to students' low usage of e-resources are associated with accessibility of the resources, unawareness of resources by students, students' lack of skills in using these resources and their inability to read the text presented to them (2016, 13). The findings reiterate the need for ongoing awareness activities and more information sessions for students. In addition, if students have access to these resources on other platforms remotely, then usage may increase.

The responses to the four items which sought feedback on the services provided by the library are displayed in table 9.

The major challenge faced by respondents regarding services offered is limited staff (71.9%) which results in delays. This is followed by obligations outside the school (61.7%) which make it difficult for respondents

Table 9: Service-related challenges experienced by students.

	Responses	SA/S	SD/D	N	Total
i	The services are inadequate.	25 (23.4%)	75 (70.1%)	7 (6.5%)	107 (100%)
ii	Limited amount of library staff, therefore, service offer delay.	77 (71.9%)	22 (20.6%)	8 (7.5%)	107 (100%)
iii	Library staff is not knowledgeable	65 (60.7%)	14 (13.1%)	28 (26.2%)	107 (100%)
iv	My obligations outside of school make it difficult to visit and use the library.	66 (61.7%)	37 (34.6%)	4 (3.7%)	107 (100%)

Key: SA = Strongly Agreed, A = Agreed, SD = Strongly Disagreed, D = Disagreed, N = Neutral Value

to use the library. This finding is supported by the demographic data which showed that some respondents worked, and others had parenting obligations. The limited staff combined with having outside obligations are likely to have a negative impact on students' use of the various services offered by the library. Online services could provide access to students who were unable to visit the physical library. This reaffirms the findings of Soria et al. (2015, 641). Approximately 61% of the students noted that the staff is not knowledgeable, which is contradictory to the number of respondents who indicated that they are satisfied with the services of the library, of which the staff is a significant component. However, 60.7% does not deviate too far from the 77% which indicated that staff was limited. The challenges with staff need to be examined by the institution with a view to finding solutions.

Discussion

The study evaluated the factors that affect students' use of a polytechnic library. The findings demonstrate that the majority of the students of West Polytechnic visit the library weekly for the purpose of using reprographic services, to conduct research, to seek help from the librarian and to prepare for practical sessions. These respondents mostly utilize printed resources such as learner guides and course reserve text. This is in keeping with the study of Fasae et al, cited in Abosede and Ibikunle (2011, 11) and Tella, Owolabi and Attama, who found that students visit the library to use textbooks and reprographics services but not for electronic resources (2008, 11). Some resources such as e-journals, audio-visual materials,

and some printed resources are underutilized. This reiterates Wells' findings that frequency of library use does not indicate optimal use of resources and services (1995, 125). Females use the library more often than males, a finding corroborated by Jones et al., (qtd. in Stone and Collin 2013, 26) and Jamil et al. (2013, 11).

Demographic and other factors contribute to students' usage patterns. The demographic profile of the majority of the participants shows that they are from low-income homes; living in marginalized urban communities; attained secondary level library experience; and are first generation tertiary students. The majority of the participants have home responsibilities and are working while attending school. These factors are likely to contribute to no-use or low usage of the library and its resources and services. These indicators may also help to shape respondents' choices or preferences in the resources and services utilized at the library. Therefore, the library needs to know its users in an effort to be efficient when catering to their information needs. This is in line with the finding of Soria et al. (2015, 642). The findings also reveal that users' satisfaction or dissatisfaction with the library's collection, services, and with the overall physical facility, was another factor which may contribute to low usage. Respondents expressed dissatisfaction due to the lack of a reading space, limited media and information sessions hosted by the library, and the library's closing and opening hours. When students are satisfied, it increases their usage; conversely, when students are dissatisfied, it reflects in their low usage of the library (Chauhan and Bhatt 2017; Nwali 1990; and Edem et al. 2009).

Most respondents only visit the library based on the lecturers' instructions. They prefer to use printed textbooks, because their lecturers cite these. In keeping with the previous research findings, students will more likely consult the same resources that they see their lecturers use, which may likely cause low usage in other resources that are not utilized by lecturers (Kerins et al. 2004; Jamil et al. 2013; Dean and Durrant 2018). Students' perception of the use of printed and electronic resources is, therefore, based upon the lecturers' use of these resources in the preparation and administration of their instructional activities, or the emphasis lecturers place on the importance of using these resources when they complete their assignments. This is the extent to which lecturers' instructional activities promote the use of the library's resources by students.

The main challenges faced by students in the use of the library's resources and services are students' poor reading levels; poor accessibility and lack of awareness of resources; inadequate supply of relevant and

up-to-date resources for all disciplines; inadequate supply of computers; and poor Internet and Wi-Fi connections. These challenges are likely to impact levels of usage by students and lecturers, a finding corroborated by Onaolapo (2016, 12), Fasae et al. adopted from Abosede and Ibikunle (2011, 7) and Tella et al. (2008, 12). It was also revealed that some participants lacked the necessary skills needed to use the computers, the library's OPAC system and online databases. In addition, students rarely attend workshops which would aid in developing basic skills. This might contribute to low usage and or nonuse of these resources and equipment, a finding supported by Fasae et al. qtd.in Abosede and Ibikunle (2011) and Tella et al. (2008). In addition, in keeping with the findings of Onaolapo (2016), inadequate library staff might hinder students' and lecturers' effective use of library resources and services, which could contribute to a loss of time and increased frustration by the students who are already having challenges using the library (13).

Recommendations

Based on the findings, the researcher recommends the establishment of a library committee. This should include students, lecturers and the librarian among others. The committee should be tasked with the responsibility to develop a strategic plan for the library, which is aligned to the strategic plan of the organization. This committee should carry out a needs - assessment to better provide information on user needs. This will help to determine the types of resources and services needed by students. This committee could see to the development of marketing and promotion programmes, the acquisition of additional resources and improvement in the programme for the delivery of information literacy. It is advised that the library has a website, awareness programmes and modern alert service will meet the needs of the diverse library users (adopted from Chauhan and Bhatt, sec 6.2)

It is also recommended that a robust reading intervention be implemented as part of the overall programme. The library can be integral in terms of providing resources and reading guidance to students. The institution will also need to invest in its ICT infrastructure by providing additional computers and Internet with faster speeds. This would need to be accompanied by more training sessions in the use of computers and online resources. This may include monthly workshops and seminars which will "ensure maximum exposure and utilization of the library information resources" and services to both lecturers and students" (Onaolapo 2016, 12).

Conclusion

The recency of the West Polytechnic College as a tertiary institution has resulted in the library being in its infant stage of development, and as such, resources are limited. Therefore, the library needs to enhance its resources and facilities in an effort to respond more appropriately to the information needs of the library users. The institution caters to diverse users, some of whom are facing reading challenges, lack the skills needed to properly navigate and use the library, and are first generation students to access tertiary education. Catering to the needs of individual members of such a diverse population poses many challenges.

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The Value of Numbers, Words, People and Relationships: An Explanatory Sequential Approach to Understanding Students' Expectations for Performance in Statistics

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Abstract

While there is a substantive body of literature on statistical anxiety and students' performance in statistics, many questions remain as to the role of motivations in that process (Onwuegbuzie 2000; Baloglu, Abbassi and Kesici 2017) and we argue, the values that are embedded within the expectations around these. Given this objective and the lack of empirical work around statistics education in the Caribbean, we used explanatory sequential design with three phases: quantitative, qualitative and integrated/iterative, to explore undergraduate students' expectations for performance in statistics. Quantitative analyses point to average to high expectations for performance in statistics, but with no variations based on sex, academic discipline and prior performance in mathematics. Quantitative findings show statistically significant associations between all four components of values, (namely utility, affect, attainment and cost), and expectations for performance in statistics, but with varying ranks and direction. Qualitative analyses offered deeper insights into the relative importance of the constructions around statistics, the role of social relations and the psychosocial outcomes of these (retention, self-efficacy, attitude). Integrated analyses elucidate on the conditions through which intrinsic and extrinsic motivations influence value constructions and expectancies related to statistics. We discuss the implications for future research, teaching and learning of statistics among undergraduate students in higher education.

Introduction

While students' performance in tertiary level statistics courses remains an underlying thread within statistics education (Garfield and Ben-Zvi 2007,

2008), there is a lack of a consensus on the factors that affect the teaching and learning of statistics within institutions of higher education (Onwuegbuzie 2004). Key points of contention remain those of suitable pedagogical approaches (Keeling 2011; Neilsen, Bean and Larsen 2018), students' attitudes towards statistics (Slotmaeckers, Karremans and Adriaensen 2014; McGrath 2014), statistical anxiety (Baloglu, Kocak and Zelhart 2007; Macher et al. 2015), as well as motivations that affect students' performance in statistics-related courses (Finney and Schraw 2003; Onwuegbuzie 2000; Baloglu, Abbassi and Kesici 2017).

There is also a lack of consensus on the definition and measurement of attitudes around statistics (Ramirez, Schau and Emmioglu 2012), with divergent attention to intrinsic and extrinsic factors that affect performance in statistics (Olani et. al. 2011; Baloglu, Abassi and Kesici 2017). We contend that in most cases that existing empirical studies (whether on statistical anxiety or attitudes) touch on the central role of values as principles, beliefs and attitudes that impact students' performance in statistics. A major argument of the paper therefore is that the value that students place on numbers, words, people and relationships presents critical points of reference within the theorizations of students' expectations for their performance in statistics. Such exploration of values situates the relational, emotional and perceptual role of these values or the ways in which students' make sense of or assign values to specific aspects of learning statistics. As a way of testing this, the study therefore explored the social construction of the values around statistics, and the relative importance of these values (conceptualized in this study, as utility, affect, attainment and cost), on students' expectations for performance in statistics.

In the context of the Caribbean, such explorations of value construction and the impact on students' expectations for statistical performance remain absent. What exist for the region however are empirical investigations on students' performance in mathematics at the primary and secondary levels (Ogunkula 2012; Ransome, Mohammed, and Bridgemohan 2016) and in the gender disparities for students' confidence to do mathematics (Brown and Kanyongo 2010). Although these studies provide an initial platform for understanding the logic and abstractions that can unfold from working with numbers, more is needed on how students are socialized to place values on numbers, words, people and relationships and on the implications of this process for their expectations for performance in statistics-related courses. The perceptions and relevance of these values are quantitatively and qualitatively explored, using

the guiding principles within expectancy value theory, to expand the way of working through the challenges of teaching and learning statistics within the context of the region.

Theoretical framework: expectancy value theory (EVT)

Attribution models have long been employed to speak to the motivations and expectations for students' success or performance. In such cases, inherent foci have been on individual values/beliefs around specific tasks or behaviours and the individual and/or collective effects of these on the expectations that individuals form in relation to specific events, activities and things. A central tenet in these attributional and motivational models is on the *situatedness* of these expectations or on the importance of social construction in one's subjective evaluation (See for instance the early work of Eccles 1987; Eccles and Harold 1991). It is in this vein that this theory has been widely applied to assess expectations for success as the main motivator for achievement (Eccles et al. 1983; Wigfield and Cambria 2010). A noted consensus in the literature therefore is on the correlation between the values associated with specific tasks and the perceived outcomes of one's engagement with this task (Wigfield 1994; Wigfield et al., 1997). A major gap however in the application of the theory is the lack of studies that interrogate the relative importance of environmental or social factors on expectancy values.

Despite existing gaps within the applications of expectancy value theory (EVT), the framework remains promising and open for further interrogations that advance existing theorizations of value-based expectations. As major advocates, Eccles et al. (1983) expanded the early model of expectancy value (a la Atkinson 1964) to draw on the relevance of task-based characteristics, the costs associated with these and the perceived value of these tasks to the expectations around these. Here, conceptualizations of expectancy as a construct factor in the beliefs or thinking related to specific tasks/areas/expectations; whether in the present or in the future. An appreciation of these processes involves the need to assess four specific sub-values and the impact of these on the expectations around specific tasks (*ibid*). These include: intrinsic value (the extent to which an individual enjoys things/events that bring personal rewards, has an interest in a specific task or experiences pleasure or joy after fulfilling a task), attainment value (the relative importance of doing well or the centrality of fulfilling a particular task for an individual), utility value

(connects to perceived personal or professional relevance, goals related to reaching external rewards or utility of the task/skills in or to one's future) and cost (the perceived amount of effort required to fulfil a task or outcome that defines whether or not one engages within a specific task (See Wigfield, Tonks and Klauda 2009; Wigfield and Cambria 2010). In these components, we see both measures of task-based and emotionally based values.

In the application of this framework, however, other researchers have attempted to refine the framework, with either the re-conceptualization of the measures or the separation of these emotional and task-based values within existing measures. Hancock (1994) for instance extended the work of Vroom's Expectancy Theory to examine the role of expectancy, the enactment of instrumentality at the individual level and the valence or value that individuals place on specific outcomes. Self-concept and environmental factors also unfolded as related factors that affect these outcomes. The central argument within this extended work is that the value that people place on outcomes, their expectations in their ability to achieve it and efforts towards these outcomes interact as a combined force, to shape the conscious choices of individuals. In this sense, motivation to learn translates into an interplay between the perceived value of an outcome and the pursuit of goal-directed activities that enhance the expectations for success. In aligning her measure of SATS-28 to EVT, Schau (2003) also asserted that affect, difficulty, cognitive competence and values are also important aspects of attitudes to be explored in understanding statistical performance. Even there, we see a collective application of values, without any variation/disaggregation of these, as theoretically proposed. Schau also advanced a conceptualization and operationalization of values where affect replaced that of utility as a task-specific measure, but with an emphasis on the feelings that one derives from a task. This is listed however as intrinsic value within the theory and indeed overlaps with some element of affective evaluations.

Through our work, we apply this value-based expectation framework within the understanding of students' expectations for performance in statistics. First, we embrace the fact that many studies continue to validate the significance of expectancy; albeit with observed variance across socio-demographic groupings (Denissen et al. 2007; Wigfield et al. 2009). Second, given the position that expectancies serve as strong predictors of the choices that students make in their personal and professional journeys (Eccles et al. 1983; Wigfield et al. 1997), this framework allows for deeper examinations of the social processes that affect these expectancies. Third,

we see the core focus on values as a central construct through which expectations and performance can be understood. In fact, EVT has been used to speak to the expectations for success (Eccles et al. 1983), academic choices (Nagy et al. 2008), attitudes towards assignments (Trautwein et al. 2006) and educational achievements (Eccles et al. 1983; Eccles and Wigfield 2002; Wigfield and Eccles 2000; 2002), just to name a few. In these cases, expectations for success have been used to determine the predictive value for success or achievement, with diverse conceptualizations and operationalization of values and attitudes. However, in our study, we extend such a theoretical discussion to include task-based, motivational and relational components of values on students' expectations for performance. Given the discussions above, we ask:

1. What are students' expectations for performance in statistics?
2. Does students' expectation for performance in statistics vary based on demographic factors (sex, academic discipline and previous mathematics performance)?
3. What is the relationship between value students place on statistics (utility, affect, attainment and cost) and their expectations for performance in statistics?
4. How do students perceive the role of intrinsic and extrinsic motivators in shaping their expectations for performance in statistics?
5. How do qualitative findings elucidate on some of the quantitative results related to students' expectations for performance in statistics?

Our work on values and students' expectation for performance in statistics at the undergraduate level tests for the above. Such examinations of the how and what around values allow the use of mixed methodologies to examine the relative significance of diverse values on students' expectations for performance. Our hope is for more comprehensive analyses that both identify the role of perceptual and relational factors and that deepen our understanding of how values are constructed to impact students' expectations for their performance in statistics.

Understanding Expectations for Performance in Statistics

While examinations of expectations provide strong predictors for actual academic performance and outcomes of students (Rodriguez 2009; Siddique et al. 2006; Nurmi et al. 2003), diverse explanations unfold. These include, but are not limited to, students' preconceived ideas and

opinions regarding statistics (Keeling 2011; McGrath 2014), previous performance in mathematics (Olani et al. 2011; Garfield and Ben-Zvi 2007), statistical anxieties (Slootmaeckers, Kerremans and Adriaensen 2014), as well as motivational beliefs related to statistics (Baloglu, Abbassi and Kesici 2017). We assert however that core to these examinations is attitudes and values related to statistics. We discuss these in the following subsections.

Attitudes, Prior Mathematics and Statistical Anxiety

Student attitudes towards statistics have been a long-standing issue for performance in statistics-related courses (Schau 2003; Nolan, Beran and Hecker 2012). Scholars have noted in particular that students may hold these attitudes even before their enrolment in a statistics course and that these attitudes shape their interaction with statistics educators, as well as with their learning of statistics (Schau et al. 1995; Onwuegbuzie and Daley 1999).

Researchers also argue that past performance or achievements, specifically in mathematics, influence students' attitudes towards statistics and inadvertently their performance in statistics courses (Schau 2003; Garfield and Ben-Zvi 2007; Paechter et al. 2017). The data show for instance that lower grades in mathematics served as a positive motivator for students (Garfield and Ben-Zvi 2007). Olani et al. (2011) in particular found that students entering introductory statistics courses with predominantly negative attitudes towards learning statistics are predisposed for negative experiences of performance. However, emerging data shows that a positive attitude towards statistics produces positive achievements. Related investigations into the role of previous performance in mathematics in statistics education have yielded mixed results.

Other researchers link previous performances in mathematics, anxiety and performance in statistics. Paechter et al. (2017) argued that previous academic performance in mathematics and statistical anxieties influences expectations for performance in statistics. The authors also asserted that previous performance in mathematics remains necessary, but not sufficient enough to explain reported variability in students' academic performance within statistical courses. However, they also show that when mediated by statistical anxiety, prior mathematics shows some association with students' performance in statistics (*ibid*). Furthermore, previous higher grades in mathematics had a negative impact on

statistical anxiety; that is, the higher the grades in mathematics, the lower their reported levels of statistics anxiety. Relatedly, the study also revealed that lower levels of anxiety around statistics also increased students' performance in statistics (*ibid*).

Values, Attitudes and Anxieties

Other researchers connect values to attitudes and anxieties. In Baloglu, Abbasi and Kesici's (2017) examination of intrinsic and extrinsic values, for instance the researchers argued that when students find value and benefits of statistics to their lives, their goal orientations become directed towards developing their competence within the field of statistics. The authors also found inverse relationships between value and goal orientation and levels of anxiety in statistics. Other studies have found strong correlations between statistics anxiety and students' attitudes and between statistical anxiety, students' attitudes towards statistics and performance (Keeling 2011; Baloglu, Kocak and Zelhart 2007; Sese et. al 2015). The research suggests therefore that attitudes and anxiety around statistics should not be conflated, should be treated separately and that these two factors affect performance and expectations for performance in statistics (Finney and Schraw 2003; Onwuegbuzie 2000).

However, another line of research also points to a mixing of statistical attitudes with that of cognitive competency (Mihai-Bogdan, Runcan and Runcan 2015; Baloglu, Abbasi and Kesici 2017). Even within that branch of research, we note the diverse application/conceptualization of academic efficacy (Mihai-Bogdan, Runcan and Runcan 2015; Baloglu, Abbasi and Kesici 2017) and cognitive competency (Schau 2003; Coetzee and van der Merwe 2010; Baloglu, Abbasi and Kesici 2017). In most cases, however, we see a consistent reporting of significant relationships for students' perceived statistical ability (as a perceptual or attitudinal measure) on their performance in statistics. Schau (2003) in particular noted the relative importance of attitudes; defined in relation to affect, cognitive competence, value and difficulty within statistics. While a key finding was that persons with positive values towards statistics had higher levels of affect, there is no attention here to other types of values that may or may not influence attitudes towards learning statistics. The push within this line of research is for greater examination of these values and the extent to which these are embedded within measures of attitudes (See e.g. Bong and Clark 1999; Eccles and Wigfield 2002; Marsh 2007).

Sex, Academic Discipline, Anxieties and Performance

Researchers also point to higher levels of statistical anxiety for female students as compared with their male counterparts (Hong and Kanstenson 2002; Baloglu, Deniz and Kesici 2011; Macher et al. 2013). Given the lack of consistency on these sex-based comparisons, other researchers push for examinations of academic discipline, statistical anxiety and performance. However, closer examinations of related studies show that these studies lack needed comparative analysis across disciplines. What we see in lieu of such comparisons are discipline-specific studies on statistical anxieties with a heavy focus on psychology (Paechter et al. 2017), sociology (DeCesare 2007), accounting (Chiou, Wang and Lee 2014) and nursing (Matthew and Atkin 2014). Where such comparisons across disciplines or fields exist (see Baloglu 2003; Keeley, Zayac and Correia 2008; Williams 2013; Baloglu, Abassi and Kesici 2017), we see a lack of analysis for the variation within statistics education.

Research Design

Given the many gaps that remain within quantitative research on statistical performance of students at the undergraduate level, and the lack of qualitative explorations that deepen the dialogue, we utilized a sequential explanatory mixed methods design. This research design allowed for the collection and analysis of both quantitative and qualitative data in two consecutive phases (Ivankova, Creswell and Stick 2006) and the integration of these two data types at the design, data collection and interpretation and reporting stages (Moselholm and Fetters 2017). We see this approach as particularly useful in cases where the quantitative results yield unexpected findings and/or when researchers want to build on initial quantitative findings (see Morse 1991 as cited in Ivankova, Creswell and Stick 2006; Creswell, Plano Clark et al. 2003). However, given the length of time needed for implementation and analysis within this research design (Creswell and Plano Clark 2017), we limited the study to the examination of undergraduate students' expectations of performance over the course of an academic year.

Phase 1: Quantitative Phase

The aim of the quantitative phase was to identify the potential relationships between values and expectation for performance in an undergraduate introductory statistics course and to determine whether these

expectations differ based on sex, academic discipline and previous mathematics performance.

Data Collection

In the first phase, we conducted a survey on first-year students' expectations for performance in statistics within the first semester of the 2017/2018 academic year. Three hundred and forty-four ($N = 344$) undergraduate students were registered for a mandatory introductory-level behavioural statistics course. Using the convenience sampling approach to solicit open participation, questionnaires were administered to all students who were present at the last lecture for the course in semester 1 of the 2017/2018 academic year. This yielded a sample of one hundred and ninety-four participants ($n = 194$), which consisted of one hundred and fifty (150) women and forty-four (44) men, with the majority of participants (177) between the ages of 18 and 22 years old (see table 1). A review of the registration statistics for the course in question points to a representative distribution for this sample.

Instrument

The researchers employed the use of a 76-item questionnaire (See appendix 3), which was pre-tested with another cohort of first-year statistics

Table 1: Distribution of Participants by Age and Academic Discipline.

Demographic	Number of Participants	Percentage
Age group		
18-22	177	91.2%
23-27	11	5.7%
28-32	1	0.5%
33-37	2	1.0%
38-42	2	1.0%
43-47	1	0.5%
Academic Discipline		
Sociology	12	6.2 %
Psychology	80	41.5 %
Criminology	33	17.1 %
Social Work	27	14.0 %
International Relations	31	16.1 %
Political Sciences	6	3.1 %
Leadership & Management	4	2.1 %

students within the summer of 2017. The questionnaire comprised demographic items, adjusted measures of values (utility, affect, attainment and cost), measures designed to measure perceived statistical competence and expectations for performance. *Demographic factors* were based on five items, namely individual's age in years, sex (male/female), the academic year in which they began their current undergraduate programme, their current enrolment status (full-time/part-time) and the programme in which they were currently registered. We measured *previous performance in Mathematics* by asking participants to indicate their grade obtained in mathematics at the Caribbean Certificate Education Certificate (CSEC) Examination. Response options ranged from Grade 1 to Grade 5. In accordance with Caribbean Examinations Council (CXC) grading criteria, lower values indicate a better performance with Grade 1 being the highest possible grade to be obtained and Grade 5 indicating a low grade.

We operationalized *Values* as a composite score of (utility, affect, attainment and cost) and as an adaptation of the Statistics Anxiety Rating Scale (STARS) (Cruise et al. 1985) and the Survey of Attitude Towards Statistics (SATS-28) developed by Schau (2003 See appendices 1 and 2). Given the focus here on values, we found the STARS measure to be most useful. The STARS is a well-tested fifty-one-item anxiety scale comprising six sub-scales, worth of statistics or perceived usefulness of statistics in everyday life (sixteen items), interpretation anxiety related to deciding on the specific tests to be used and reading of the results (eleven items), test and class anxiety (eight items), computational self-concept when computing statistical problems (seven items), fear of asking for help (four items) and fear of statistics teachers (five items). However, while the STARS is one of the most tested measures of statistics anxiety (Onwuegbuzie 2004; Keeley, Zayac and Correia 2008; Macher et al. 2013; Baloglu, Abassi and Kesici 2017), the questions also cover attitudes (presented in the SATS-28 scale) and as we have argued values.

The adaptation of the STARS and SAT-28 measure therefore emerged as a response to the call for the separation of attitudes and anxieties (Finney and Schraw 2003; Onwuegbuzie 2000). Given that the semester in which this study was undertaken coincided with a change in teaching staff, and that students repeating the course would have interacted with both former and current staff, we also removed the fear of statistics teachers' sub-scale to avoid validity errors. All other sub-scales were used and adapted in order to measure the values which students attach to statistics. Necessary adjustments to the wording of specific items were also made in consideration of the study's population of interest. Scoring of sub-scales

was consistent with that of the original scale. In order to avoid redundancy of items, statements which were found to be similar in both the STARS and SATS-28 were used; additional items from the STARS which measured statistical anxiety explicitly were used in tandem with these. The adjusted version of this STARS scale and the integration of the affect measure within the SAT-28 scale allowed for needed refinement of the value constructs presented in the EVT. With the exception of *affect* (taken from the SAT-28 instrument), all of the other three constructs, namely *utility*, *cost* and *attainment*, were adapted based on the STARS instrument. We present the conceptualization and measurement of these below.

Value 1: Utility (eleven items)

Utility value refers to the perceived personal or professional relevance or utility of the task/skills in the future. For the purposes of this study, we defined utility value as the perceived personal or professional relevance of learning statistics, enrolling in a statistics course or doing a statistics examination. In measuring this value, eleven items from the worth of statistics sub-scale were used. Given the diverse findings around utility as a value, we state that:

H_0 : *There is no significant correlation between utility and expectation for performance in statistics.*

H_1 : *There is a significant correlation between utility and expectation for performance in statistics.*

Value 2: Affect (seven items)

Affect refers to an individual's feeling towards specific tasks. For the purposes of this study, this refers to a student's attitude towards learning statistics, that is, learning statistics-related content at the present time, and not based on a perception of future benefits. In order to measure affect, we used five items from the worth of statistics sub-scale and two items from the computational self-concept sub-scale. These items directly asked about personal liking and feelings towards statistics. Higher scores for this sub-scale indicate a lower positive affect. We therefore hypothesized that:

H_0 : *There is no significant correlation between affect and expectation for performance in statistics.*

H_1 : *There is a significant correlation between affect and expectation for performance in statistics.*

Value 3: Attainment (fifteen items)

Attainment, as defined previously, refers to the relative importance of doing well or the centrality of fulfilling a particular task. For the purpose

of this study, we conceptualized attainment as a task value and defined as the students' perceived competence in doing statistics as a subject, both conceptually and technically. We measured this value using five items of the computational self-concept sub-scale and ten items of the perceived statistical competence measure designed for this study. This measure required participants to self-report their level of perceived competence on a five-point scale ranging from not at all (1) to completely (5) in answering the following question: "On a scale of 1 to 5, how competent are you in the calculation of each of the following...?" A list of ten calculation-based areas covered in the course was provided, for which participants were required to indicate their level of competence. These areas included calculation of measures of central tendency, variability, parametric and non-parametric statistical tests. These items were combined with five items of the computational self-concept sub-scale of STARS in order to create a holistic measure of attainment. Items from the computational self-concept sub-scale were reverse-coded to match the scoring of the perceived statistical competence measure. Higher scores for this value indicate a higher sense of attainment in doing statistics. Given these findings, we state:

H₀: There is no significant correlation between attainment and expectation for performance in statistics.

H₁: There is a significant correlation between attainment and expectation for performance in statistics.

Value 4: Cost (twenty-three items)

Cost refers to the perceived amount of effort required to complete a task and which determines an individual's engagement in that task. In this study, we defined cost as the student's perception of the anxiety they would experience in completing statistical-related tasks and asking individuals for help with statistics. The four items of the fear of asking for help sub-scale, as well as eleven items of the interpretation anxiety and eight items of the test and class anxiety sub-scales were used in measuring cost. A higher score for this sub-scale indicates a higher perceived cost of engaging in the specified tasks, that is, performing statistical operations, doing a statistics examination and asking for help. Therefore, we test for the following:

H₀: There is no significant correlation between cost and expectation for performance in statistics.

H₁: There is a significant correlation between cost and expectation for performance in statistics.

Cronbach's alpha for the complete scale was 0.947. Using the items/question of each sub-scale, total scores for all sub-scales were computed

Table 2: Reliability analysis for measure of values.

Sub-scale	Cronbach's alpha
Utility (11 items)	0.910
Affect (7 items)	0.847
Attainment (15 items)	0.856
Cost (23 items)	0.921

within the Statistical Package for Social Sciences (SPSS) software to determine the reliability for all measures (See Appendix 2). All sub-scales were between 0.84 and 0.92. This is shown in table 2 below.

We defined *expectations for performance in statistics* as students' prediction of their performance on an examination in the future. We measured this using a fifteen-item scale developed for this study. Participants were required to answer the following question: "On a scale of 1 to 5, how well do you think you will perform on an examination if asked to answer a question on the following...?" A list of fifteen areas covered in the course was provided, for which participants were required to indicate their expected performance on a scale of very poorly (1) to very well (5). Areas of course content included the research process and research design, normal distribution, measures of position and named statistical tests. We calculated a total Expectation for Performance in Statistics Score so that a participant could have a maximum score of seventy-five points. Cronbach's alpha was 0.897.

Data Analysis

We analysed the quantitative data using SPSS 24.0. Given the lack of a random sample as a requirement for parametric testing, we employed the use of non-parametric statistical analysis for the quantitative data. Even there, we used the Kolmogorov-Smirnov statistic to test for normality to verify the appropriateness of the testing applied. Given the lack of normality in the data set, we used the Spearman's Rank Order Correlation to determine the association between values (utility, affect, attainment and cost) and expectation for performance in statistics, if any. We used the Mann-Whitney test to examine differences in expectation for performance based on sex and the Kruskal-Wallis to test for differences in expectation for performance based on previous performance in mathematics and programme in which currently registered.

Phase 2: Qualitative Phase

The aim of the qualitative phase was to explore students' construction of the values (related to numbers, words, people) and the impact on their expectations towards statistical performance. The intention in this qualitative phase was to probe deeper into the nature of these values, how these were constructed and the connections to students' expectations for performance in statistics.

Data Collection

Data collection for the qualitative phase of the study took place in August 2018, at the end of the 2017/2018 academic year. This was based on the integration of data through the sampling frame utilized (Fetters, Curry, and Creswell 2013). However, for this phase, a purposive sample of nine (9) students who participated in the quantitative phase was selected for participation in focus groups. Our consideration was that this type of sampling design served as an effective way of ensuring the transferability of the data (Lincoln and Guba 1985). These students were selected based on the principle of maximum variation, with actual performance in the semester 1 2017/2018 statistics examination used as the criterion for selection. For the qualitative phase, we solicited the involvement of three (3) students who received A grades, three (3) students with B grades and three (3) students who did not pass the course for participation in the qualitative phase. However, based on the availability of both the researchers and participants, the final sample for the qualitative phase consisted of four (4) students, with no students who failed the course. However, given that the study aimed to investigate expectations for performance and not actual performance in statistics, we determined that the absence of these participants would not adversely affect the accuracy of findings.

Based on student availability and consent, one semi-structured interview was conducted with one of the male students, while three students participated in the scheduled focus group. Three of the students received A grades, while the other student received a B+ grade; the sample consisted of two males and two females, all between the ages of 18 and 25 years of age. With the exception of one participant in his second year, all of the others were within their first year of university. This is described in table 3 below.

The one-on-one interview lasted for 50 min, while the time extended to 2 hours and 10 minutes for the focus group interview. Both forms of data collection took place in the office of one of the researchers. We applied the same interview protocol for the one-on-one and focus group interviews.

Table 3: Description of participants.

Categories	Sex	Age	Grade	Year	Programme
P1	Male	24	B+	II	Leadership and Management
P2	Female	21	A-	I	History
P3	Female	20	A	I	Sociology
P4	Male	23	A+	I	Criminology

Interview Protocol

The interview protocol consisted of eighteen (18) questions based on the literature and building on the findings from the quantitative phase of the study (Moselholm and Fetters 2017). The questions covered course-specific issues such as student experience with the course content, their view of course assessment and suggestions for course improvement. Participants were also asked to describe key highlights and biggest challenges experienced while pursuing the course and to indicate if they thought statistics should be a compulsory course within higher education. In order to explore the concerns of statistical anxiety, participants were asked questions such as "Do you have any fears or anxieties as it relates to statistics? If so, what are they and why?" Additionally, participants were asked to describe their previous experience with mathematics and whether they thought that experience shaped their view of statistics prior to registering for the course. Participants were then asked to explain, in their view, what contributes to student success or failure in courses generally and in statistics, in particular. This prolonged engagement of participants was purposely designed to enhance the richness of the data and the credibility of the responses shared.

Data Analysis

Interview and focus group meetings were audio-recorded, transcribed verbatim and reviewed for accuracy by all three researchers. The transcripts of the recordings were then coded using key phrases within the interview and thematically analysed using structural and theoretical first order coding where the responses were connected back to the research questions and the theoretical framework employed in the study. In this case, the use of structural and theoretical coding of key interpretations/meanings, issues and contentions that emerged within the focus group interview. This also fosters a more experiential approach to understanding the cognitive and affective domains of students, specifically, as it relates to their expectations for performance in statistics

at the undergraduate level. By doing so, we embrace thematic analyses that fall strictly within the qualitative paradigm, where the emphasis is on using an organic approach to coding and thematic development of the data (Braun and Clarke 2013). These interpretations were subsequently triangulated across researchers to enhance the credibility of the interpretations (see Lincoln and Guba 1985).

Ethical Considerations

The study received ethical approval from the campus ethics committee and informed consent from all participants. The approved stamp and ID number (CEC333/10/17) remained on the cover of the consent form for the visibility of students during the quantitative data collection process. During that process, students were debriefed on the nature, objectives and significance of the study and were given instructions for the completion of the survey and information on the use of the interview data, before we solicited their consent and participation.

Phase 3: Integration

The third phase of the study entailed the analytical integration of the data collected in the quantitative and qualitative phases (Fetters, Curry and Creswell 2013). We specifically employed the approach of "following the thread" (see Moran-Ellis et al. 2006 as cited in O'Cathain, Murphy and Nicholl 2010). Based on the statistical significance of the relation between values and expectations for performance in statistics within the quantitative study, the role of values and, more importantly, the relations that instill these were further explored through the qualitative phase using both the one-on-one and focus group interviews. This quantitative "thread" was then examined through the thematic analysis of the qualitative data. After further cross-analysis of the quantitative and qualitative, we then developed a collective understanding of the issues underpinning student expectations for their performance.

Findings

In keeping with the principles of mixed methods research, in this section we present findings from our study across the three phases. Here, we provide the findings observed for phase I, II and phase III. In the latter instance, the findings represent our narrative, utilizing the contiguous approach (Fetters, Curry and Creswell 2017), in which our quantitative and qualitative findings are presented separately followed by an exploration of our integrated findings. These are addressed in the following subsections:

Phase 1: Quantitative Findings

Expectation for Performance in Statistics

Statistical analysis revealed that generally students held average to high expectations for their performance in the introductory statistics course ($mean = 56.64$, $SD = 8.365$), with scores ranging from 39 to 74 on an original scale of 15–75 (with fifteen questions on a 1–5 Likert Scale). Disaggregation of scores showed that the majority of students (ninety-four students or 52.2 per cent) reported average expectations for performance in statistics, while eighty-five students (47.2 per cent) reported high expectations (as seen in table 4).

The Kolmogorov–Smirnov test statistic showed a test statistic of 0.072, with df (180), and significance at 0.023, suggesting that the data is not normally distributed. Similarly, the Shapiro–Wilk test statistic was at 0.977, with degrees of freedom of 180 and a corresponding significance of 0.005, also suggesting that the data significantly deviate from a normal distribution. The high responses or outliers within the data set affected this distribution. This distribution is reflected in figure 1.

Demographics Factors and Expectation for Performance in Statistics

We also examined the extent to which expectation for performance in statistics differed based on demographic factors (sex, academic discipline and previous mathematics performance). With regard to sex, the findings suggested that there are no significant differences in expectation for performance in statistics between male and female students, $U(180) = 3175.00$, $P > 0.05$. Closer examinations show for example that male students had a mean rank of 81.13, while the female counterpart held a mean rank of 93.18. Additionally, we saw no statistically significant differences in expectation for performance in statistics based on students' academic

Table 4: Distribution of scores for students' Expectation for Performance in Statistics.

Expectation for Performance in Statistics	Frequency	Percentage
Low (15–37)	1	.6%
Average (38–56)	94	52.2%
High (57–75)	85	47.2%
Total	180	100.0%

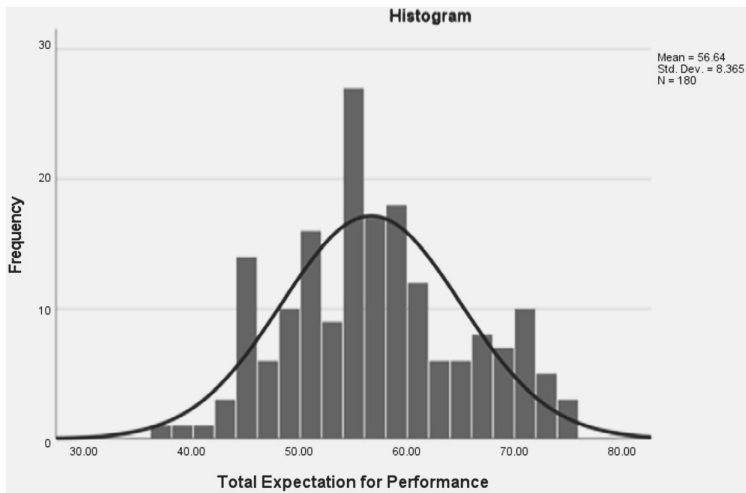


Figure 1: Histogram showing students' EFP in Statistics

discipline $H(6, 179) = 2.916, P > 0.05$. Similarly, we found no statistically significant differences in students' expectations for performance based on their prior performance in mathematics, with $H(3, 180) = 7.064, P > 0.05$.

Values and Expectation for Performance in Statistics

Associations were observed however between value constructs and expectations for performance in statistics, resulting in the rejection of all null hypotheses. In the case of hypothesis 1, we see a weak negative correlation between utility value and expectation for performance, $\rho(175) = -0.397, P < 0.01$. This result suggests that the less students see the utility of statistics as evidenced by high scores on this variable, the worse they expected to perform in the statistics course. In reference to hypothesis 2, we found that affect was negatively correlated with expectation for performance, $\rho(175) = -0.439, P < 0.01$, indicating that the less students enjoy statistics as represented by the higher the score for affect, the worse they expected to perform. Interestingly, the result for hypothesis 3 indicates that the more the students see themselves as being capable of fulfilling the task of doing statistics as shown by high scores for the attainment value, the better they expected to perform, $\rho(173) = 0.727, P < 0.01$. With regard to hypothesis 4, a moderate negative correlation was found between cost and expectation for performance, $\rho(164) = -0.613, P < 0.01$. Higher scores for this value indicated a higher perceived cost; therefore, the higher the students perceive the cost of

Table 5: Spearman's Rho for Values (Utility, Affect, Attainment, Cost), and Expectation for Performance in Statistics.

Value	Expectation for Performance in Statistics
Utility (n = 175)	-0.397**
Affect (n = 175)	-0.439**
Attainment (n = 173)	0.727**
Cost (n = 164)	-0.613**

Note. ** = $P < 0.01$

doing statistics, the worse they expect to perform in the course. Table 5 captures the individual *Spearman's rho* for each value and the expectations for performance in statistics.

The central importance here of values, albeit with negative and positive outcomes on students' expectations for performance in statistics, raised two important questions related to the underlying basis on which these values are constructed and the ways in which students' make sense of this process. The qualitative exploration of these questions provided an opportunity to gain needed explanations of this association.

Phase 2: Qualitative Findings

Qualitative data underscored the social factors that affect values construction and impact as it relates to students' expectations for their performance in statistics. Through this qualitative exploration, we see that values are constructed and assessed in relation to numbers, words and people. The following sections speak to this.

Attaining Statistical Knowledge: The Value of Numbers and Words

In the interviews, students stressed on the significance of numbers and words within the teaching and learning within the classroom. As a starting point, participants underscored the importance of understanding both the written and tabular material available for the understanding of statistics. P1 for instance underscored the need for students to know the key aspects or "tricks" in understanding statistics; those being, knowledge of statistical formulae, suitability of specific tests and ways of interpreting these. These emphases on the calculative and interpretive aspects of statistics for P1 heightened attention to the requirement

for students to "know the information" (in this case both the assumptions of the tests and the formulae sheet) in order to ensure that statistical tests are correctly selected and applied. P4 extended this discussion on the attainment of knowledge component to that of the pedagogical approaches that are applied in the classroom. P4 noted in this case the attention to the calculative aspect of statistics and relatedly to students' ability to get the process right, with little requirement of reading around the statistical tests being applied. As part of communicating this, P4 espoused that:

When she was presenting it in some of the examples she would use....you understand it from the point of view she understands it. So it was easy to go up on the board, especially in tutorial classes, and then re-do the same stuff. And then if we were wrong, she would let you complete it first and then you did it over. Then she would say, "This is not this way, it's that way." And then you-. By repeating the process, obviously you get it.

While both P1 and P4 acknowledged the focus on what can be seen as the attainment aspect of statistical performance, P1 also reflected on the short-lived or temporal nature of this approach and on the negative effects on one's self-schema. In fact, he shared that "I saw it as really difficult... because I would go into the class and get everything that the lecturer is saying...and then go home and then draw blanks....and then you would come in class...and second-guess yourself".

As a way of enhancing retention and critical thought within the learning of statistics, other students called for the integration of more qualitative or textual presentations of statistics; both in the calculation and application of statistics. Here, the use of words emerged as a specific pedagogical approach where the emphasis was on the use of lived realities or constructed scenarios to assist with problem-based learning as applied to statistics. In particular, P1 asked for the use of the "story mode" to teach statistics, the need to "pull a story into it", to "use live examples...to help certain people understand how it is linked back to research". In expanding on the above, P1 stressed on the need to link actual social phenomena or re-representations of stories or events using problem-based learning with contextualized examples to teach statistics. P2 suggested that "in sociology we are looking at a phenomenon. [So now we can] use back the [statistical] language [in research]". Here, the suggestion is for applied statistics that are situated within everyday realities.

Shaming as a Cost of (Non)Attainment

The importance of relational and behavioural dynamics emerged as another key aspect of students' motivations for the learning of statistics

and, inadvertently, that of their statistical expectations. In the study, the findings suggested that where the emphasis is on the calculative competencies of students or on their ability to demonstrate this, then this indirectly resulted in the punishment or shaming of students who were not able to do so. As such, participant 1 suggested that "students are not going to raise their hand in the lecture to say that they do not understand". When probed on the reason for this perception, this participant indicated that raising one's hand signaled a lack of knowledge. The related perception is that larger classes challenge students to seek further clarification or to communicate through the rising of the hand, based on the fear of perceived incompetence and shame. Thus, P1 noted that "well raising your hand, first you're saying I do not understand. You're not going to raise their hand in a lecture with 200 plus students. You still have to do it in the lecture but in the tutorial you should place a little more emphasis on it." P2 similarly contended that "some people are embarrassed and [that she understood] why". For this participant, the perception was that those students who have the knowledge or understand the statistical tests and their calculations discourage students who cannot. She noted that "[when someone grasps it, they may be like, 'why is this such a hard thing for you to understand". This for P2 creates a perception of incompetence and a fear of communicating otherwise. He shared that students will avoid "this kind of scrutiny". For P3, this public gaze extended into not just perceived competence or shame, but also into issues of identity. P3 noted in this case that "a lot of students around our age struggle with identity. They don't even know the degree they are pursuing is what they want. So for them to say they don't understand something...it is a microcosm of a bigger problem that we have".

In all three cases, the concern is for how a situation of non-understanding might be named or labelled as a form of punishment; both by those who had the knowledge and those who did not. Even there, participants called for deeper questioning of the social relations, constructions of attainment within that dynamic and the collective effects on how students make sense of themselves, their abilities and their expectations. In fact, students suggested that these experiences and constructions directly affected their level of confidence, as it relates to their statistical abilities or competencies. P1 suggested that this is a "big issue". He elaborated that when students are in that position:

... They are lost and confused...because they still don't know what they like or what they want to do.... but ...there's so much pressure from outside. So if you get more pressure like, "You don't want to learn." Like I don't have interest.

And, "This is on you." If you tell me those words I'd turn off and like, you are blaming me and you don't know who I am. Excuse? No. You have to-. That's me. You can't talk rough or be very offensive.

Again, the focus is on the social scrutiny and pressures, of public blaming and shaming by peers and the ways in which students respond to these. When such social dynamics are not factored into the pedagogical approaches to the teaching of statistics, then students conjecture that many students will be left behind in the course.

Finding Utility and Motivation: the Value of People and Relationships

The interviews also pointed to the perceived value and motivations for doing statistics. In the first instant, participants reflected on their varied motivations for doing the statistics course. In most cases, participants made reference to the central role of attaining a pass. However, where students did not understand the materials being taught, we saw the tendency to adopt a survival mode of engagement in the classroom.

P2: Honestly, I think it is just survival because as I said people...Some people do statistics not to understand but to pass. You need the course to graduate. So if they see the question come repeatedly they learn the question like that. They don't learn how to apply and okay, if you see X, Y and Z you still know these are the steps. They may not be in the same order but you know how to apply it because you grasp the whole thing, not just like chi square. You know how to apply chi square, what it's used for, etcetera, etcetera. Some people just do it to pass, rather than to understand.

In this case, the cost was that of putting out minimal effort to pass the course. Even there, there is a question about what is required to pass the course, rather than just excelling. P1 suggested that this is particularly the case when students lack an interest in statistics or from a theoretical perspective, do not have an *intrinsic value around* doing statistics. He also contended that this resulted from the predominant use of rote learning by teachers within the school system, with a heavy emphasis on testing and evaluation and on knowing the nature of these. He indicated in this case that "like CAPE and CSEC...past papers [are used] and CAPE is predictable...you know what is coming... and you know how to..." Here, students elaborated on the inability of students to apply the knowledge in cases where they are working from the unknown. He also suggested that "students are doing it, for doing it sake...not paying attention to how it is applied... [Or] to its "life-long status. They are doing it in the short term...not in a way that they would remember." P4 further espoused that this is based on the use of rote learning

in early primary school education and the lack of applicability to other aspects of one's life. He explained in this case that "when you're in primary school and you're doing...algebra... [you think that you] never ...have [to] use algebra other than in school. You don't see a sign asking you to find x over y , nowhere. It is not applicable in life".

This lack of applicability affects both their retention of the information and *utility* that they attach to statistics. P1 challenged researchers on the need to "stress on the importance of [statistics] ...and hope that it gets to the students". P2 claimed that it is also about not having the "passion...or liking for what you are doing." P2 called it a "lack of motivation or [the practice of] doing things with the motivation of just wanting to pass, or just wanting to be done". Yet, P4 underscores the need for individual application of statistics. P4 moved to a position that anyone who failed the course did so because they "simply did not put in the work". He stressed that those "who want to pass the course, will pass the course." In sharing his experiences in business development, he noted that:

Now...I want to start my own business and develop an app. I need statistics now to put in my proposal to show that it's feasible. So I do believe that people who come to do this facility, be it business or otherwise, could play a role in your future endeavours regardless of what you do.

This tension between *intrinsic vs extrinsic value* also centred around her position that "some people [do it] because their parents send them to school to [get] a degree...some of them do not want what [their parents] want.... [so] they just here for being here, warming the bench, scrapping the 2.0 to make sure GATE would fund them...so some of them just don't have that". P3 confirmed that many students are there "because parents say to". So in this case, she conjectured that they, "go do a degree, just because." Where the lack of autonomy existed, the low intrinsic values and the higher relevance of extrinsic rewards were observed.

A key finding however was that of the possibility within recalibrating the key motivations for values/meanings around statistics. P1 elaborated that one can only move beyond this limitation if it is that they have the "passion" for it. In his case, he pointed to a particular level of innate hunger for success, to perform, to excel; a drive he noted to gain knowledge. When this is present, he claimed that they would be more aligned to say "Listen, I need to get this 4.0 GPA. I need to get this A plus. I need to get all A's this semester. And I'm going to do this work to get that because that's what I want and that's my goal". Here, the utility and affective values deepened the intrinsic motivations for learning statistics. In all cases,

the discussion stems back to that of the intrinsic value of doing statistics and the need for an internal drive, motivation for doing so.

Phase 3: Value Assessments and Expectancy: A Relational Account

In keeping with the principles of mixed methods research, in this section we present findings from our study. Here, we use an iterative approach where we weave quantitative and qualitative findings together (Fetters, Curry and Creswell 2017, 4) or put differently, allow the “data to talk to each other” during the analysis (Moselholm and Fetters 2017).

We start therefore with the observation at the collective level that within the quantitative approach, all value constructs (utility, attainment, affect and cost) were significant, but with varying degrees and strengths, to students’ expectations for performance in statistics. We learn through the interviews that the relational dynamics serve as the underlying thread across all these values. Thus, at a collective level, the qualitative data show that (whether it is utility, cost, attainment or affect) students’ expectations for their performance in statistics are influenced by the relationships that they have with people (particularly teachers, peers and parents) and that the messages about statistics that are communicated through these relations.

Through the quantitative phase, we see within the comparative relevance of these values constructs that attainment and cost ranked the highest, but with a positive and negative impact respectively on students’ expectations for performance. The qualitative interviews provide an explanation. Based on the interviews, we see the central importance of relationships and on the message of attainment that are shared with teachers, friends and parents, but with different impacts. Such is the case of the perception that through their interaction with teachers’ that students are socialized to centre on the cognitive and calculative aspects of doing statistics. We see however that the relationships with their peers produces a focus on (in)competence; presented in the interviews as their ability or not to attain this knowledge. Yet, we also learn through these interviews of the ways in which cost is being perceived; both in relation to the effort that is required to pass and the fear that students developed based on this. Whether communicated through their teachers, parents or friends, we see that the message remains that of attaining the knowledge or that of passing the course. These interactions and messages also influenced students’ sense of confidence, motivations to learn and the type of goals that they develop or do not develop in the process.

In this case, their motivations become externally driven by these relational factors.

On the flip side, we saw through the quantitative data that both affect and utility produced weak associations, but with positive and negative impacts respectively on students' expectations for performance in statistics. The interviews also show that though students had positive feelings about statistics, these feelings both interacted with the focus on attainment, which collectively impacted their negative perceptions of its utility. Through the qualitative data we discover that the value placed on numbers in the classroom and the lack of emphasis on real-life application, using words and stories, produced low perceptions of utility related to statistics, both within and beyond the classroom. While participants suggested that positive levels of affect and utility are closely linked to intrinsic motivation, they also underscored the ways in which the focus on attainment takes away from the possibilities within this.

Discussion

According to the expectancy-value model of achievement or performance, the values and expectations around key tasks are significant to how one affectively and cognitively relates to these tasks. Our findings confirm this core proposition, but with no variations in the quantitative data, based on sex, academic background or prior performance in mathematics. A review of the literature suggests that many of these categorical factors continue to yield mixed results and that these were insufficient on their own to influence statistical performance (see Baloglu, Abassi and Kesici 2017; Paechter et al. 2017). While the quantitative results showed no difference in expectations for performance in statistics based on previous mathematics performance, the qualitative findings suggest that pedagogical approaches to mathematics at the early levels (primary and secondary) influence the values that students develop towards statistics. Yet, while the incorporation of real-world application and problem-based learning to both mathematics and statistics has been advocated, there are few studies to date that empirically test the effectiveness of these measures (Pan and Tang 2004). A useful starting point for the region however is within existing studies on mathematics education for the region (Brown and Kanyongo 2010; Ogunkula 2012; Ransome, Mohammed, and Bridgemohan 2016) and in the call for focused thinking pedagogy that situates critical thinking and in particular real-life applications into

constructions related to the utility and competencies related to mathematical knowledge (see Bell-Hutchinson 2008). When situated within the ongoing challenges for learning and teaching statistics in higher education, these provide important insights into the pedagogical foundations of this problem at the primary and secondary school levels within the English-speaking Caribbean.

In both the quantitative and the qualitative data, value assessments based on all four components remained critical to the average to high expectations for performance in statistics that were reported by undergraduate students within this sample, albeit with diverse directions and rankings. Theoretically, this finding adds to the credibility of this subjective evaluation of values. Empirically, these associational findings and the variations within the strength of these relationships between values and expectations are also consistent with existing literature in this area (see Keeling 2011; Baloglu, Kocak and Zelhart 2007; Sese et. al 2015; Baloglu, Abbassi and Kesici 2017). While in many cases, existing studies speak directly to the relationship between attitudes and anxieties, our examinations of these diverse values underscore the need for further teasing of these value and attitude-based measures (Eccles and Wigfield 2002; Schau, 2003; Finney and Schraw, 2003). The explanations obtained through the qualitative findings in this study also make a credible case for more nuanced interrogation, conceptualization and operationalization of these value assessments and expectancy.

Collectively, the findings also support the need for greater exploration of the social dynamics that affect learning and teaching of statistics. While this is embedded with EVT, this social aspect of expectancy value theory remains less than visible within the literature. Thus, while our work has confirmed that attitudes are embedded within values (Bong and Clark 1999; Eccles and Wigfield 2002; Marsh 2007), we also advanced through our qualitative data the early work that speaks to the relevance of social constructions within one's subjective evaluations of values and expectancy (See Eccles 1987; Eccles and Harold 1991). The qualitative data also underscored the impact of this process on students' perception of their statistical competencies and efficacies (Mihai-Bogdan, Runcan and Runcan 2015; Baloglu, Abbassi and Kesici 2017). Our contribution in this case is that of the relational foundations embedded within the social constructions of these value and expectancy assessments. This relational element unfolded in terms of how students are socialized to learn about statistics, the messages that are

communicated about statistics, the impact on individual self-schema and the motivations to learn statistics. These are areas of much needed research for the Caribbean.

Finally, motivation remains a key aspect of the expectancy-value theory (Hancock, 1994; Wigfield and Cambria 2010). While intrinsic value as a motivational measure was separated in the quantitative instrument and explored more directly in the qualitative, we found motivational dynamics to be more nuanced and situational and in need of further quantitative and qualitative explorations of the impact on expectancy. What was already established in the field is that there are differences in how individuals are motivated to engage (Lawler, 2003) and that these differences would have an impact on both expectancy and success (Finney & Schraw 2003; Onwuegbuzie 2000; Baloglu, Abbassi and Kesici 2017). Through this study, we show that value assessment, based on the type, has not only varying effects on expectations, but also on motivations. We also assert that these assessments and motivational outcomes are nuanced by pedagogical and relational experiences within the classroom. This importance of both the pedagogical and relational components of expectancy is consistent with the main propositions of the theory, which underscores the importance of active learning to motivations for success and the choices that students make (see Eccles et al. 1983; Wigfield and Cambria 2010). Researchers however reiterate the need for considerations that explore both intrinsic and extrinsic motivators for success (Olani et. al. 2011; Baloglu, Abassi and Kesici 2017). We support this call.

Conclusion

The study examined the relative significance of values and the impact on students' expectations for statistics. The findings confirmed both the complexity in values related to statistics and the diverse effects that these produced on students' expectations for performance in statistics. Collectively, the study shows that the values as constructed are situated within students' relationship to their teachers, friends and family members. Across all social spaces, students developed meanings of diverse values based on the key messages communicated within that circle of influence. These findings advance the need to move beyond the focus on the attainment or cognitive aspect as a measure of performance and to push for greater explorations of statistics education that diversify some of the values around the learning and teaching of statistics. Where relationships, whether in the classroom or within their family, remain critical to the

process of defining and positioning these values, then it is important to address the relational and social aspect of learning, while centring the roles and impact of key actors in the process. These findings open the conversation on the need to contextualize while situating the values towards statistics in students' everyday interactions and engagements.

While the study was limited to a snap-shot picture of students within a particular semester and with a small group of students within the interviews, the findings provide important baseline data that can be used to further nuance the role of relational, pedagogical and value assessments to expectancy within. Future research can extend this examination to the role of these values in the actual performance of students in statistics and other research-based courses, as well as the relative effects of values over time and across diverse contexts with the Caribbean. Moreover, the importance of these values must be considered by instructors in these courses, specifically as it relates to the values with which students enter a course or programme and how these values are either reinforced or changed during the course. Recognition of the systems and interactions through which such values are created and maintained is also necessary on the part of instructors and course administrators.

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APPENDIX

Appendix 1: Amendments to STARS scale

<i>Sub-scale</i>	<i>Original Item</i>	<i>Adjusted Item</i>
Worth of Statistics	Affective skills are so important in my profession that I don't want to clutter my thinking with something as cognitive as statistics.	Affective emotion/feelings) skills are so important in my profession that I don't want to clutter my thinking with something as cognitive (logic/ rational) as statistics.
	Statistics is worthless to me since it's empirical and my area of specialization is philosophical.	Statistics is worthless to me since it's empirical and my area of specialization is philosophical (theoretical)
Interpretation Anxiety	Reading an advertisement for an automobile which includes figure on gas mileage compliance with population regulations, etc.	Reading an advertisement for a product which includes figures and numerical data
	Interpreting the meaning of a probability value once I have found it.	Interpreting the meaning of a probability value (p-value) once I have found it.
	Interpreting the meaning of a table in a journal article.	Interpreting the meaning of a table in a book or journal article.
Computational self-concept	I can't even understand seventh- and eighth-grade mathematics; how can I possibly do statistics?	I can't even understand secondary school-level mathematics; how can I possibly do statistics?
Fear of Asking for Help	Asking someone in the computer center for help in understanding a printout.	Asking someone help in understanding a graph
	Asking a fellow student for help in understanding a printout	Asking a fellow student for help in understanding a graph
	Asking one of your professors for help in understanding a printout.	Asking one of your professors for help in understanding a graph.

Appendix 2: Adaptation of STARS Items to Values

Value	Cronbach alpha	Item
Utility (11 items)	0.91	<p>I don't see why I have to clutter up my head with statistics. It has no significance to my life work.¹</p> <p>I feel statistics is a waste.¹</p> <p>I wish the statistics requirement would be removed from my academic program.¹</p> <p>I'm never going to use statistics so why should I have to take it?¹</p> <p>I don't understand why someone in my field needs statistics.¹</p> <p>I wonder why I have to do all these things in statistics when in actual life I'll never use them.¹</p> <p>Affective (emotion/feelings) skills are so important in my profession that I don't want to clutter my thinking with something as cognitive (logic/ rational) as statistics.¹</p> <p>Statistics is worthless to me since it's empirical and my area of specialization is philosophical (theoretical)¹</p> <p>Statistics takes more time than it's worth.¹</p> <p>Since I am by nature a subjective person the objectivity of statistics is inappropriate for me.¹</p> <p>I lived this long without knowing statistics, why should I learn it now?¹</p>
Affect (7 items)	0.847	<p>Statistics is a grind, a pain I could do without.¹</p> <p>I don't want to learn to like statistics.¹</p> <p>I can't tell you why but I just don't like statistics.¹</p> <p>I could enjoy statistics if it weren't so mathematical.²</p> <p>Since I've never enjoyed mathematics. I don't see how I can enjoy statistics.²</p> <p>Statistical figures are not fit for human consumption.¹</p> <p>Statistics isn't really bad. It's just too mathematical.¹</p>
Attainment (15 items)	0.856	<p>I can't even understand secondary school-level mathematics; how can I possibly do statistics?²</p> <p>I haven't had mathematics for a long time. I know I'll have problems getting through statistics.²</p> <p>I'm too slow in my thinking to get through statistics.²</p> <p>I don't want to learn to like statistics.²</p> <p>Statistics is for people who have a natural learning toward mathematics.²</p>

Cost (23 items)	0.921	Asking someone help in understanding a graph. ³
		Asking a fellow student for help in understanding a graph. ³
		Asking one of your professors for help in understanding a graph. ³
		Going to ask my statistics teacher for individual help with material I am having difficulty understanding. ³
		Figuring out whether to reject or retain the null hypothesis. ⁴
		Making an objective decision based on empirical data. ⁴
		Reading an advertisement for a product which includes figures and numerical data ⁴
		Interpreting the meaning of a probability value (p-value) once I have found it. ⁴
		Trying to understand the odds in a lottery. ⁴
		Interpreting the meaning of a table in a book or journal article. ⁴
		Trying to decide which statistical test is appropriate for your research project. ⁴
		Reading a journal article that includes some statistical analyses. ⁴
		Trying to understand the statistical analyses described in the abstract of a journal article. ⁴
		Arranging to have a body of data put into the computer. ⁴
		Seeing a student pouring over the computer printouts related to his/her research. ⁵
		Walking into the classroom to take a statistics test. ⁵
		Doing the final examination in a statistics course. ⁵
		Studying for an examination in a statistics course. ⁵
		Doing the homework for a statistics course. ⁵
		Finding that another student in class got a different answer than you did to a statistical problem. ⁵
		Enrolling in a statistics course. ⁵
		Going over a final examination in statistics after it has been graded.
		Waking up in the morning on the day of a statistics test. ⁵

Note: 1 – Worth of Statistics Sub-scale; 2 – Computational self-concept sub-scale; 3 – Interpretation Anxiety sub-scale; 4 – Fear of Asking for Help sub-scale; 5 – Test and Class Anxiety sub-scale

Appendix 3 - Questionnaire

Dear Students,

The purpose of this research is to explore the possible associations, if any, between statistical anxiety, competencies and expectations for performance in statistics. This assessment is part of wider project geared towards improving the delivery and outcomes of [name of course].

This questionnaire has five (5) sections that cover questions on demographics, statistical anxiety, statistical competencies, and expectation for performance in statistics.

The questionnaire will take no longer than 20 minutes to complete.

Please note that:

- Your participation in this survey is voluntary
- Students will only be selected based on their willingness to be involved in this study
- Willing participant must sign the attached consent form
- There are no risks associated with this process
- There are no monetary benefits attached to participation in this survey

Should you have any questions on the above, please feel free to email either [emails provided].

Thanking you in advance for your consideration and participation.

Kind regards,
[Names of researchers]

Section 1: Demographic Questions

What is your age (years)?

1. 18-22
2. 23-27
3. 28-32
4. 33-37
5. 38-42
6. 43-47
7. 48-52
8. 53 years and older

What is your sex?

1. Male
2. Female

In which academic year did you start your current academic programme?

What is your enrolment status?

1. Full time
2. Part-time

Which programme are you currently registered in?

1) Sociology	2) Psychology	3) Criminology	4) Social Work
5) International Relations	6) Political Sciences	7) Leadership and Management	8) Other

Section 2: Previous Performance in Mathematics

What was your grade for mathematics at the CSEC level?

1. Grade 1
2. Grade 2
3. Grade 3
4. Grade 4
5. Grade 5

Section 3: Statistics Anxiety

Please indicate the extent do you agree or disagree with the following statements:

Worth of Statistics	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I don't see why I have to clutter up my head with statistics. It has no significance to my life work.					
I feel statistics is a waste.					
I wish the statistics requirement would be removed from my academic program.					
I'm never going to use statistics so why should I have to take it?					
I don't understand why someone in my field needs statistics.					
I wonder why I have to do all these things in statistics when in actual life I'll never use them.					
Affective (emotion/feelings) skills are so important in my profession that I don't want to clutter my thinking with something as cognitive (logic/ rational) as statistics.					
Statistics is worthless to me since it's empirical and my area of specialization is philosophical (theoretical)					
Statistics takes more time than it's worth.					
Statistics is a grind, a pain I could do without.					
I don't want to learn to like statistics.					

Since I am by nature a subjective person the objectivity of statistics is inappropriate for me.					
I can't tell you why but I just don't like statistics.					
I lived this long without knowing statistics, why should I learn it now?					
Statistical figures are not fit for human consumption.					
Statistics isn't really bad. It's just too mathematical.					
Computational self-concept	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I can't even understand secondary school-level mathematics; how can I possibly do statistics?					
I haven't had mathematics for a long time. I know I'll have problems getting through statistics.					
I'm too slow in my thinking to get through statistics.					
I could enjoy statistics if it weren't so mathematical.					
Statistics is for people who have a natural learning toward mathematics.					
Since I've never enjoyed mathematics. I don't see how I can enjoy statistics.					
I don't want to learn to like statistics.					

For the following statements, please rate your level of anxiety experienced:	Scale				
	No				High Anxiety
Fear for Asking for Help					
Asking someone help in understanding a graph	1	2	3	4	5
Asking a fellow student for help in understanding a graph.	1	2	3	4	5
Asking one of your professors for help in understanding a graph.	1	2	3	4	5
Going to ask my statistics teacher for individual help with material I am having difficulty understanding.	1	2	3	4	5
Interpretation Anxiety					
Figuring out whether to reject or retain the null hypothesis.	1	2	3	4	5
Making an objective decision based on empirical data.	1	2	3	4	5
Reading an advertisement for a product which includes figures and numerical data	1	2	3	4	5
Interpreting the meaning of a probability value (p-value) once I have found it.	1	2	3	4	5
Interpreting the meaning of a table in a book or journal article.	1	2	3	4	5
Trying to decide which statistical test is appropriate for your research project.	1	2	3	4	5
Reading a journal article that includes some statistical analyses.	1	2	3	4	5
Trying to understand the statistical analyses described in the abstract of a journal article.	1	2	3	4	5
Arranging to have a body of data put into the computer.	1	2	3	4	5
Seeing a student poring over the computer printouts related to his/her research.	1	2	3	4	5
Test and Class Anxiety					
Walking into the classroom to take a statistics test.	1	2	3	4	5
Doing the final examination in a statistics course.	1	2	3	4	5
Studying for an examination in a statistics course	1	2	3	4	5
Doing the homework for a statistics course	1	2	3	4	5
Finding that another student in class got a different answer than you did to a statistical problem.	1	2	3	4	5
Enrolling in a statistics course.	1	2	3	4	5

Going over a final examination in statistics after it has been graded.	1	2	3	4	5
Waking up in the morning on the day of a statistics test	1	2	3	4	5

Section 4: Perceived Statistical Competence

On a scale of 1 to 5, how competent are you in the calculation of the following:

	1 Not at all	2	3	4	5 Completely
Measures of Central Tendency					
Measures of Variability					
Measures of Position (z-scores)					
Areas under the curve (using Table Z)					
Percentile					
The Chi square test					
The Pearson's Product Moment Correlation					
Independent samples t-test					
Dependent samples t-test					
Analysis of Variance (ANOVA)					

Section 5: Expectations for Performance in Statistics

On a scale of 1 to 5, how well do you think you will perform on an examination if asked to answer a question on the following:

	1 Very poorly	2 Poorly	3 Not sure	4 Well	5 Very well
The research process					
Research Design					
Frequency Tables					
Graphical Illustrations					
Measures of Central Tendency					
Measures of Variability					
The Normal Distribution					
Measures of Position (z-scores)					
Areas under the curve (using Table Z)					
Percentile					
Applying the 7 Steps in hypothesis testing to the Chi-square test					
Applying the steps in hypothesis testing to the Pearson's Product Moment Correlation					
Linear Regression					
Applying the 7 steps in hypothesis testing to the T-test					
Applying the 7 steps in hypothesis testing to Analysis of Variance (ANOVA)					

University Students' Readiness for Online Learning in the Context of Emergency Remote Learning: A Comparison of Students' Preparedness and Lecturers' Views

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Abstract

Due to concerns related to the increasing spread of the coronavirus (COVID-19), from March 2020, traditional face-to-face classes at all educational levels in Jamaica were replaced with online teaching and learning. This convergent mixed methods study compared university students' reported readiness for engaging in online learning within this context, with lecturers' views of the challenges that students experienced with the transition to emergency remote learning. Quantitative data were collected from 132 university students in one department using an online survey, while qualitative data were collected from nineteen lecturers who taught a total of forty courses within the same department using a questionnaire that was disseminated via email. One key finding is that most students reported being technologically prepared, but exhibited poor technical aptitude, online study skills and weak online learning lifestyles that are required for engaging in online learning. This finding was corroborated by lecturers who also noted that some students appeared to be unfamiliar with technology tools. The findings suggest that instruction should be organized in ways that accommodate students' technical challenges. However, it is imperative that there is shared collaboration and a community endeavour to improve students' technical aptitude, study habits and learning lifestyle for improved online learning readiness.

Keywords: online learning; emergency remote learning; university; preparedness; readiness; COVID-19; Jamaica.

Background

On 10 March 2020, Jamaica confirmed its first imported case of SARS-CoV-2 disease (COVID-19) (Ministry of Health and Wellness 2020). Following this announcement, the leadership of the Mona Campus of The University of the West Indies (UWI) took a decision to suspend face-to-face classes for one month, effective 13 March 2020, in light of concerns related to the spread of the virus within the university community (Patterson 2020). The UWI released an online post which stated that during the one-month hiatus, all entities which facilitated the delivery of courses were expected to prepare to engage students solely through an online platform on the resumption of classes on 14 April 2020. The suspension of classes was also to allow students to prepare for online engagement of classes, having generally previously engaged in only face-to-face classes (Marketing Recruitment and Communications Office 2020). However, due to varied constraints for many students, such as a lack of sufficient financial resources, the limited time of one month may have been inadequate to fully prepare for online learning. In this regard, the principal noted at the end of 2020, that out of every five students, one did not have computer access to participate in online classes and examinations (Mastercard Donates 200 Laptops to UWI 2020). UWI and other local and international organizations attempted to fill this void, especially as it related to devices, through initiatives such as the distribution of devices to students in need and the Laptop Loan from the campus library (Mastercard Donates 200 Laptops to UWI 2020; The Gleaner 2020a). Against this backdrop and within the context of the transition to emergency remote learning (ERL), the purpose of the research is to compare university students' readiness for engaging in online learning, with lecturers' views of the challenges that students experienced on resumption of classes.

Review of Related Literature

Online Learning

Online learning is educational instruction that takes place partially or entirely via the Internet, with asynchronous or synchronous learning, but with no physical face-to-face class time (Means et al. 2010, Broadbent 2017). Based on the rapid, global transition from face-to-face learning to online learning, it is projected that by 2025, online learning will be the established method for providing affordable and flexible education

(Palvia et al. 2018). Using this medium, students could access learning materials, interact with content, as well as engage with their lecturers and other students (Rasouli, Rahbania, and Attaran 2016, Martin, Stamper, and Flowers 2020). It also affords the added advantage of being suitable for students who are working, have families, or do not fit in with formal classroom schedules (Palvia et al. 2018). Online learning, however, requires a dependence on and aptitude for technology, and a level of readiness for the online learning environment (Gay 2018, Callo and Yazon 2020). Although students typically use or adapt to new technologies associated with online learning, many exhibit poor online communication skills and online study habits (Callo and Yazon 2020).

Emergency Remote Learning

At UWI, some classes were offered online prior to the COVID-19 pandemic; however, the dominant mode for delivery of classes was face-to-face. Due to the pandemic, the university pivoted to ERL which is learning that occurs during school closure in response to a crisis or catastrophe (Rahiem 2020a) and exists only until the situation causing the crisis or emergency has abated (Hodges et al. 2020). This type of learning is significantly different from well-planned learning that occurs during a typical semester of teaching (Rahiem 2020b). Its goal is to provide students with quick, but reliable access to instruction and instructional support that temporarily replaces their previously scheduled classes. Similar to most universities internationally, UWI adopted this ERL strategy to transition all face-to-face classes to an online modality.

Students' Readiness for Online Learning in an ERL

Context

The pivot to online learning in the moment of COVID-19 required substantial changes in educational institutions' cultures and structures, as well as in students' remote classroom behaviour (Gigliotti 2020). Given that students' readiness for learning in the online environment has a positive impact on their overall learning outcomes, a critical aspect of ERL is understanding students' perceptions of their levels of preparedness, challenges and preferences (Gigliotti 2020, Rahiem 2020b, Martin, Stamper, and Flowers 2020). Since students had little time and many of them had no prior training in studying online, along with the fact that little is known about the successes or challenges regarding ERL in higher education, it is necessary to evaluate the extent to which students were

prepared for this transition to online learning (Rahiem 2020a). The aforementioned highlights the currency and importance of the present research undertaking, since key educational stakeholders need to ascertain the fidelity of any change to educational practice. It is vital that they are able to provide the requisite support to those who are integrally involved in the implementation of the change and to make ongoing amendments as needed.

Given the need to shift to online learning within the context of ERL, Hodges et al., (2020) urged educational institutions to identify and implement those internal and external resources that were necessary to support the transition, and to understand where and how students have struggled the most with ERL. This will, in turn, provide feedback to further inform stakeholders until the crisis has been brought under control. This study aims to fill the gap identified by Hodges et al., (2020) within higher education in the Caribbean, where there is a dearth of literature on this topic.

Online learning relies on the use of the Internet or connectivity to a campus network. Therefore, it is important that students be adequately prepared and equipped for this switch from the traditional method of learning to online learning (Ngussa et al. 2020, Rahiem 2020a). Failure to assess students' level of readiness can contribute to negative course outcomes as students with no devices or connectivity could be placed at a disadvantage (Kearney and Garfield 2019, Rahiem 2020a). Educational disparities raise critical issues of equity, social justice or equal distribution of social benefits which are disadvantageous from a societal perspective (Palvia et al. 2018, Evans 1997). This study is, therefore, important and timely as it may bring to the fore any disparities in student preparation that may exist and hence issues of equity and social justice that need to be addressed by university leaders.

Conceptual Framework

Some conceptual frameworks on the readiness for the online learning environment have measured engagement among instructor and students, interaction in online discussions, self-directed learning, learner control, and motivation for learning (Hung et al. 2010, Watkins, Leigh, and Triner 2004, Yu and Richardson 2015). Other frameworks more suitable for this study identified common attributes of students who are prepared for online learning, or a minimum level of readiness necessary for them to be successful in an online course. These frameworks categorized their readiness as being equipped with the necessary technology tools and access to

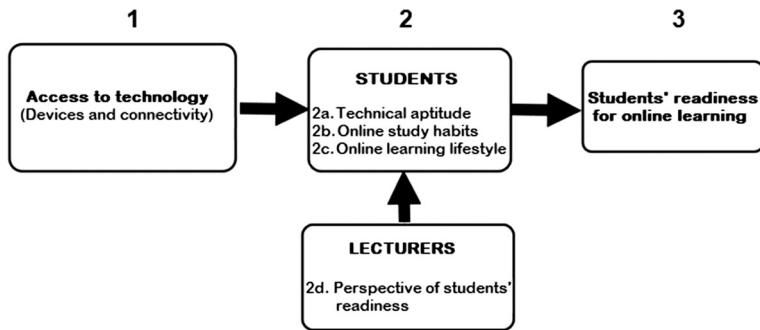


Figure 1: Conceptual framework

a stable Internet connection, competence in computer literacy regarding basic device hardware and software setup, study habits that involve their ability to participate in self-directed learning, and their readiness for online study (Martin, Stamper, and Flowers 2020, Küsel, Martin, and Markic 2020, Gay 2018, Holsapple and Lee-Post 2006).

This study uses the conceptual framework adapted from Holsapple and Lee-post (2006) to evaluate student readiness for ERL (see figure 1). It first explores the extent to which students have access to devices and reliable connectivity, denoted by 1 in the framework. Students then evaluate their technical aptitude, online study habits and online learning lifestyle, while lecturers share their perspective of students' readiness, depicted by 2 in the framework. Students' overall level of readiness for the online environment which follows from 1 and 2 is then captured and depicted in 3.

Category 1: Students' Access to Technology (Devices and Network)

Engaging in online learning implies that students must have access to a computer device and a way of connecting to the Internet. While most students tend to use a laptop computer to engage in online learning, there may be a few caught in the digital divide where their only online access is a mobile phone or tablet. More so, issues such as incompatible devices or sharing devices with other family members were reported as challenges that students faced when accessing online courses (Gay 2020, Rahiem 2020b). More so, the restrictive nature of these smaller devices could reduce the chances of this group of students successfully completing their courses via an online environment. Based on students'

dependence on suitable computer devices, educational institutions need to quickly determine whether students own or have access to appropriate devices to support their transition to online learning.

Indeed, students who experience technological challenges may also not have Internet access or adequate bandwidth to study during the COVID-19 pandemic (Rahiem 2020b). However, Internet access and connectivity may not necessarily have been a main concern prior to the pandemic, since students would have been in face-to-face classes or have had free access to the campus network for any online activities. Since poor Internet connectivity has been reported as one of the biggest challenges for students, then educational institutions need to quickly (Thaufeega 2016, Gay 2018, Beaunoyer, Dupéré, and Guitton 2020, Rasouli, Rahbania, and Attaran 2016). The importance of an adequate technology infrastructure for students to comfortably access their courses is, therefore, unquestionable; it is the backbone for studying in an online learning environment (Beaunoyer, Dupéré, and Guitton 2020).

Category 2a: Students' Technical Aptitude

Computer skills is another factor that impacts students' readiness for the online learning environment. Students should be knowledgeable about using the technology tools required for their courses and how to get help for technology issues if necessary (Rasouli, Rahbania, and Attaran 2016). This promotes positive attitudes about working in the online learning environment (Küsel, Martin, and Markic 2020). More so, students who have these technical skills are able to manipulate content and use associated technology tools, resulting in successful learning outcomes in their online courses (Holsapple and Lee-Post 2006, Rasouli, Rahbania, and Attaran 2016). If students lack minimal technical aptitude, then they may be further disadvantaged if only phone or online support is allowed for technical support, especially because of physical distancing restrictions of the pandemic (Beaunoyer, Dupéré, and Guitton 2020).

Category 2b: Students' Online Study Habits

Prior online course experience and good computer-related skills have a positive effect on students' confidence in the online learning environment (Martin, Stamper, and Flowers 2020). However, finding a quiet location to study and avoid distractions was reported as a major challenge for students who were studying online (Martin, Stamper, and Flowers 2020). Being self-disciplined, managing a study schedule, and staying on task

to participate in the online course during a pandemic is a huge undertaking for most students (Martin, Stamper, and Flowers 2020).

Category 2c: Students' Online Learning Lifestyle

Students' self-directed learning and motivation were found to play a significant role in their readiness for online learning (Chung, Subramaniam, and Dass 2020, Martin, Stamper, and Flowers 2020). More so, competence and confidence in accessing and using technology can result in increased students' preference for engaging in the online environment (Küsel, Martin, and Markic 2020, Chung, Subramaniam, and Dass 2020). This promotes active participation during online sessions as well as in discussion boards, and often results in meeting deadlines for the submission of coursework (Martin, Stamper, and Flowers 2020, Malan 2020). However, it should not be assumed that students instinctively know how to participate in online learning (Malan 2020).

Category 2d: Lecturers' Perspective of Students' Readiness

The readiness of lecturers and students for online learning has been well documented. Indeed, numerous studies have focused on the digital divide of these users regarding their lack of access to the Internet or provision of stable connectivity (Chung, Noor, and Mathew 2020, Gigliotti 2020, Rahiem 2020b), perceptions of their own preparedness for online teaching or learning (Broadbent 2017, Chung, Noor, and Mathew 2020, Gay 2018, Callo and Yazon 2020, Küsel, Martin, and Markic 2020), student engagement in the online environment (Malan 2020), and the impact of lecturers' online teaching on students' success (Kearney and Garfield 2019). Since lecturers are responsible for providing course content and assessments while engaging with students during the semester, then students' performance is typically documented (Martin, Stamper, and Flowers 2020, Means et al. 2010). More so, interaction during live sessions could provide useful information on students' Internet access, use of technology tools and engagement in the online environment. Nevertheless, research thus far has been lacking specifically about lecturers' perspectives of students' readiness for online learning. The framework provides another angle to triangulate the two points of view regarding online learning in the moment of ERL.

Against this backdrop, with a majority of students having previously taken only face-to-face classes, the purpose of this research is to compare university students' reported technical aptitude, study habits and lifestyle

readiness for engaging in ERL, with lecturers' views of the challenges that students experienced with ERL. In this regard, the study focuses on the online readiness of students within the ERL context, interrogating the following:

To what extent are students technologically prepared?

What are the characteristics of students who are prepared?

To what extent are students ready for online learning?

What are lecturers' views of the challenges that students experienced?

How do university students' reported readiness for engagement compare with lecturers' views of the challenges that students experience with ERL?

Methodology

Research Design

A convergent mixed methods design was adopted for this research which aimed to understand students' levels of readiness for online learning in the School of Education during the COVID-19 pandemic. The intent for using the convergent mixed methods design was to obtain different views on students' readiness for online learning at the university level from the students' perspective (the larger population) and the lecturers (a small population). In integrating the qualitative and quantitative data, the results were compared to obtain a comprehensive understanding of students' readiness for online learning during the abrupt transition from face-to-face to online learning caused by the COVID pandemic. This study took place within one department on one site of a Caribbean university with five campuses located in separate geographical locations.

Quantitative data were collected using an online survey for graduate and undergraduate students, while qualitative data were captured from email responses received from lecturers. Statistical results were then compared and corroborated with the qualitative findings (Creswell and Creswell 2018). Figure 2 presents the methodological framework that was adopted for this research.

Quantitative Component

Participants

Data were collected from 184 students from the School of Education at The University of the West Indies, Mona Campus. However, only 132 of these students had completed all of the relevant items which were used

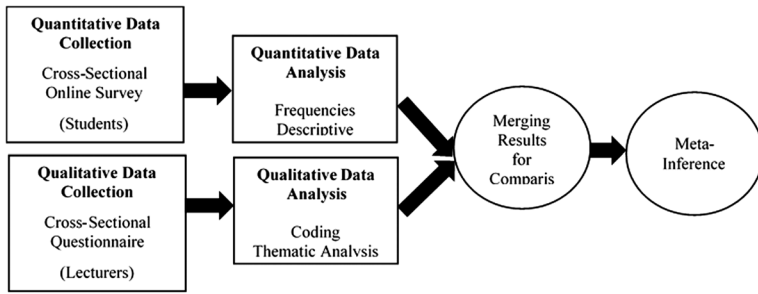


Figure 2: Methodological framework

for the data analysis presented in this paper. Most of the students were women (87.9%), while 34.8% of the students were in the 30–39 age range, and 37.9% were enrolled in the first year of study. Purposive sampling was used based on students' and lecturers' availability and willingness to complete the survey or submit email responses, respectively (Creswell and Creswell 2018).

Data Collection

Instrument

Quantitative data were collected using a survey that was adapted from the framework developed by Holsapple and Lee-Post (2006). This survey was created using SurveyGizmo® and organized into two main categories, one of which had three subcategories which used a five-point Likert-type scale, ranging from '1 = Strongly Disagree' to '5 = Strongly Agree'.

Category 1: The access to technology category comprised three items. Students were asked whether they owned a device to gain access to the campus network, had access to the Internet, and if so, to list the types of devices, and types of network access.

Category 2: This category comprised the technical aptitude, online study habits and online learning lifestyle subcategories, which are explained in more detail below.

Category 2a: The technical aptitude subcategory comprised seven items that captured responses on students' technology literacy, as well as device hardware and software setup. These items asked students whether they had specific software applications required for their courses, whether they had access to a web browser, printer or ability to scan documents, or knew how to contact the campus technology services help desk.

Category 2b: The online study habits subcategory comprised four items that captured responses that related to students' preference for

online learning. Items asked students whether they had a private place to study alone, had adequate uninterrupted time to participate in online classes, and competence in communicating using electronic technologies.

Category 2c: The online learning lifestyle subcategory consisted of seven items that captured responses on how students learn best. Items asked students whether they were eager to try new applications, met assignment deadlines, had a tendency towards the structure of a classroom or online environment, as well as their preference for written or verbal feedback.

Pilot Study

A pilot study was conducted at the start of April 2020. To establish content validity, four research experts reviewed the survey questions, and comments received were used to reword and reduce the number of items to be more accessible to respondents. The electronic survey was then created using SurveyGizmo® to facilitate efficient collecting and objective coding of the data. In addition, in light of the COVID-19 pandemic, the use of an electronic survey was the safest and most practical means of administering the survey instrument. The hyperlink to the survey was emailed to twenty undergraduate and graduate students from different departments within the university. Responses collected in SurveyGizmo® were imported into Microsoft Excel version 16 for coding of the data then exported to Statistical Package for the Social Science (SPSS) version 23 for data analysis. Comments from the students were used to further reorganize the items. To ascertain the reliability of the survey instrument, the Cronbach's alpha was calculated for the overall instrument and subscales to determine the internal consistency between items. The value of alpha for the instrument was .843, showing good internal consistency which indicated that the instrument was reliable (Hung et al. 2010, Creswell and Plano Clark 2018).

Main Study

To collect the quantitative data for the main study, the survey link was emailed to all registered students within the School of Education and responses were accepted between May and June 2020. Reminders to complete the survey were also emailed to students in early June to increase the student response rate.

The internal consistency of the subcategories was assessed to determine whether the instrument was reliable and the Cronbach's alpha was found to be above the acceptable value of .70 (Hung et al. 2010). Table 1 shows the calculated alpha coefficients for the survey and each of the subcategories.

Table 1: Reliability statistics for the e-readiness questionnaire.

Scales	Cronbach Alpha	Number of items
Technical aptitude	.740	7
Online study habits	.743	4
Online learning lifestyle	.794	7
Overall instrument	.850	18

Quantitative Data Analysis

The data analysis for the quantitative component of the research consisted of several steps and provided answers to the first three research questions of this study. The data set comprising 184 responses was first downloaded from SurveyGizmo® into Microsoft Excel version 16. The variables with numerical values were then coded and cleaned for anomalies and partial responses (Hung et al. 2010). This resulted in the deletion of fifty-two responses from the data set, which was then imported into the software application Statistical Package for the Social Science (SPSS) version 23. The final data set consisting of 132 responses was then analysed using frequencies, percentages and descriptive statistics to provide answers to the quantitative research questions.

Furthermore, to answer research question two, regarding the characteristics of a student who is ready for online learning, the items with the highest mean values in each of the three subcategories, 'Technical Aptitude', 'Online Study Habits' and 'Online Learning Lifestyle' were used. The items with the lowest mean values were used to identify students who would likely have challenges engaging in online learning (Gay 2018, Holsapple and Lee-Post 2006).

Finally, to provide an answer to the third research question, 'To what extent are students ready for online learning', the overall mean of every student in these three subcategories was calculated. In keeping with previous research, if each mean was a value of four or above out of a maximum of five, then the student was categorized as ready for online learning (Holsapple and Lee-Post 2006, Gay 2018).

Qualitative Component

While the quantitative survey was being carried out among students, faculty members within the School of Education were also being canvassed for their qualitative perspectives on the readiness of their students for online teaching and learning, and the kinds of challenges students

encountered as they engaged in ERL. These lecturers were in an ideal position to provide the requisite information that could be compared with the students' responses as they conducted weekly synchronous sessions with the students who participated in the current research over the duration of the semester. They also interacted with their students in the online courses via email messages, discussion posts, and during online office hours where they provided assistance regarding course work and other course-related matters. Thirty-four lecturers were sent a questionnaire via email. Two questions, 'What are the perceived challenges that students experience with online learning?' and 'Is there anything else that you wish to share about week 1 of online teaching and learning?' were relevant to this paper's research focus. During the week of 20 April 2020, nineteen lecturers responded to the questions that were sent. The email responses provided insightful data that offered substance on which of the lecturers' views aligned with or diverged from the self-reported readiness and challenges identified by their students.

Qualitative Data Analysis

To answer research question 4, qualitative data analysis was undertaken. The approach to the analysis of the qualitative data was guided by Creswell (2012) and consisted of several steps. The typed responses that were received were initially organized by question in a Microsoft Word document to facilitate efficient data management and analysis. The verbatim responses to the two questions were mapped to the codes in the online survey (ownership of a device, network connectivity, technical aptitude, online study habits, and online learning lifestyle).

Mixed Methods Data Analysis

To provide an answer for research question 5, which is the 'mixed' component of the mixed method research design, the lecturers' qualitative responses were aligned with the corresponding quantitative items for the students' ownership of a device, network connectivity, technical aptitude, online study habits, and online learning lifestyle to identify points of convergence and divergence. Finally, the means and descriptions of the quantitative items along with the lecturers' responses were written up (see table 6) to present the naturally emergent story about the students' lived realities that coincided with the lecturers' online experiences with the students.

Ethical Considerations

All participants were informed, by email, of the purpose and nature of the study as well as information about the researchers and how the results will be summarized and communicated. Participants were informed that the information received would be stored confidentially and anonymized and gave their written consent on submission of their responses. All data captured for the study were subsequently cleaned and all identifying data and tags were removed. Only summaries of the data provided or excerpts from quoted feedback are reported in this paper.

Findings

Quantitative Findings

Research Question 1: To what extent are students technologically prepared for online learning in an ERL context?

Table 2 presents the ownership and distribution of devices amongst the sample. Most of the respondents (91.8%) reported that they had a device of their own that they could use to access and engage with online learning. Eleven students reported not having a device of their own, but listed devices that they would use to access their online classes. In this regard, four (3.0%) reported having a laptop and mobile phone only, three (2.3%) mobile phone only, three (2.3%) laptop only and one (0.8%) laptop, tablet, mobile phone only. This suggested that while they may not have owned a device, they may have had access to at least one device by sharing with others.

The devices that students had available for accessing online learning included desktop, laptop, tablet, and mobile phone. The majority of the

Table 2: Ownership of devices among the respondents.

Ownership of device	N	%
<i>Yes</i>		
Desktop, laptop and/other devices	113	85.61
Tablet only	1	0.76
Tablet and mobile phone only	1	0.76
Mobile phone only	6	4.55
<i>No</i>	11	8.32
Total	132	100.00

students (85.6%) reported that they owned either a desktop and/or laptop for accessing online learning, while eight students (6.1%) stated that they possessed only either a tablet and/or mobile phone. The type of device used for engaging in online learning may be limiting depending on the tools and strategies (e.g., Whiteboard) that course facilitators use in online classes. It is, therefore, wholly positive and a notable finding that an overwhelming number of students in this study appeared to be technologically ready for online learning, as it relates to the ownership of a device such as a desktop or laptop that allows for the full use of all of the features of varying online platforms.

Another component of students' technological preparedness for online learning was their access to a dedicated network connection or an Internet Service Provider as a means of connecting to the Internet. Eighty-four (63.6%) of the students indicated that they had the aforementioned. The finding that almost four out of ten students did not have access to a dedicated network indicates a distinct digital divide, as it relates to Internet access. In addition, notably, 12 (10.5%) students reported that they used only mobile data for accessing their online classes, while 67 (45.7%) used only a residential access network. The residential access network was the most popular means of accessing the Internet for online classes.

Research Question 2: What are the characteristics of students who are prepared for online learning for the ERL context?

Tables 3, 4, and 5 show the descriptive statistics for the technical aptitude, study lifestyle and study habits subcategories. On one hand, the highest mean values in each of the three subcategories corresponded to a student who has access to a web browser (M: 4.24; SD: .86), routinely communicates with others using electronic technology (M: 4.24; SD: 0.74), and is a self-motivated, independent learner (M: 3.60; SD: 1.04). These items defined a student who is ready for online learning within an ERL context. On the other hand, a student who was not ready for ERL seemingly did not have a printer, or the ability to scan documents (M: 2.57; SD: 1.56), did not have persons and/or resources nearby who could assist with any technical problems regarding software applications or computer hardware (M: 2.20; SD: 1.23), and was uncomfortable waiting for written feedback and preferred receiving immediate verbal feedback (M: 2.73; SD: 1.17).

Research Question 3: To what extent are students ready for online learning within an ERL context?

The mean of all items of the three subcategories indicated that the level of readiness of the group of students surveyed was 3.35 out of 5 or 67%. Since this is below the threshold of 4 or 80%, these students were

Table 3: Descriptive statistics for items related to students' technical aptitude.

Items	Mean	SD
Subcategory 2a (seven items)	3.62	.723
<i>I have access to...</i>		
• a web browser (such as Firefox, Microsoft Edge or Google Chrome)	4.24	.864
• the Internet for substantial periods of time (perhaps forty-five minutes or so, at least three times a week.)	4.04	.999
• applications that I need (e.g., word processor, spreadsheet, presentation, or PDF)	4.00	1.05
• a printer, or have the ability to scan documents	2.57	1.56
• My computer or device setup is sufficient for online learning	3.57	1.17
• I know how to access the campus' IT Services Help Desk (MITS) (phone, email, online or other remote methods)	3.55	1.11
• I receive emails sent to my campus email address even though it may not be my primary account	3.41	1.28

Table 4: Descriptive statistics for items related to students' online study lifestyle.

Items	Mean	SD
Subcategory 2b (four items)	3.27	.894
<i>I have access to...</i>		
• I have a private place (e.g., at home or at work) for online sessions that I can use for extended periods	3.41	1.31
• I have adequate time that will be uninterrupted so that I can participate in my online courses	3.22	1.38
• I routinely communicate with persons using electronic technologies (such as e-mail, WhatsApp text messaging and voice notes)	4.24	.74
• I have persons and/or resources nearby who will assist me with any technical problems I might have with my software applications as well as my computer hardware	2.20	1.23

classified as not yet ready for online learning. The means for each of the three subcategories were then analysed for each student to determine whether *each* mean derived a value of four or above. The results showed

Table 5: Descriptive statistics for subscales related to students' online study habits.

Items	Mean	SD
Subcategory 2c (seven items)	3.08	.823
• I value and/or need flexibility. That is, I prefer working online than when I travelled to campus two to three times a week for a traditional class	2.86	1.55
• I am eager to try new applications when asked to use them (such as a new piece of application software for a course)	3.34	1.11
• I am a self-motivated, independent learner	3.60	1.04
• It is not necessary that I be in a traditional classroom environment to learn	3.00	1.31
• I am comfortable waiting for written feedback rather than receiving immediate verbal feedback.	2.73	1.17
• I am proactive with tasks, tending to complete them well in advance of deadlines	2.86	1.12
• I communicate effectively and comfortably by typing rather than handwriting	3.20	1.26

that only eight (6.0%) of the students were deemed to be adequately prepared for online learning, while 124 (93.9%) failed to meet this threshold.

Research Question 4: What are lecturers' views of the challenges that students experienced?

Among the nineteen lecturers, twenty-six of their comments revealed that students' challenges towards online learning fell into major themes corresponding to the conceptual framework of this study: (1) connectivity and issues with the subthemes of unstable connections and limited or unavailable Internet access (fourteen lecturers); (2b) online study habits (five lecturers), with the subthemes of privacy to study and inexperience with using new technology tools required for courses; and (2c) online learning lifestyle (four lecturers), with subthemes of nonparticipation and inability to meet assignment deadlines.

Sub-category 1: Lecturers' views of students' access to technology

Fourteen lecturers reported that their students experienced issues with access to the network or stable Internet connectivity. Subthemes included

Wi-Fi issues, unstable Internet connectivity. Specifically, their verbatim responses were that students had issues with '*Unstable WIFI access*', '*Wifi but not a biggy (had to send credit to two students ...)*' and '*Unstable internet service*'. Regarding poor Internet connectivity, lecturers also reported that '*Some students have unstable internet connections*', and that '*They have issues with connectivity, limited data, and bandwidth. Quality of sound not always the best. And a comment was made by one student that these challenges are compounded if you live in the rural areas.*' More so, another lecturer reported that '*One student in St Thomas used her phone as a hotspot. This did not work out for her. As soon as she logged in she was out after a few minutes. This was the trend for both classes.*' This has implications for those who depend on their mobile phones for Internet access, reinforced by another lecturer's observation, that the '*Cost of data access is prohibitive for some students.*'

Sub-category 2a: Lecturers' views of students' technical aptitude

Issues with students' technical aptitude relates to students' inability to manipulate their hardware or software setup. The qualitative data from the lecturers did not reveal any views relating to students' technical aptitude.

Sub-category 2b: Lecturers' views of students' online study lifestyle

Issues with students' study lifestyle point to whether they had adequate uninterrupted time to participate in online classes, their preference for online learning, or competence in communicating using electronic technologies. Five lecturers reported issues in this subcategory, noting that students' lack of adequate uninterrupted time to participate in online classes was a major issue: '*Some of the students' home spaces are inappropriate for online classroom instructions to occur effectively (because there are interruptions from family members such as children's background noises or jumping into the window frame, vehicular noises filtering in, sounds of pets/animals in the background)*'. In addition, lecturers had concerns about their students' (in)ability to engage in online learning, so much so that one lecturer shared that '*Some students do not like online classes; they do not consider themselves as online learners*'. While, another lecturer cautioned that '*Given that a majority of the students have not done any online class, the not so strong ones will not participate adequately.*' More poignantly, lecturers shared concerns about students' competence in communicating using

electronic technologies, noting that *'Some students are unfamiliar with the technology (which, for some, this will cause them to be left behind, while with others, they will need far more processing time to develop their savvy)'*.

Sub-category 2c: Lecturers' views of students' study habits

Four lecturers shared their experiences regarding their students' online study habits. This included working in the online environment to meet assignment deadlines, and receiving written feedback over verbal feedback. Lecturers noted concerns about their students meeting deadlines. Specifically, one lecturer shared that *'Issues of data collection (in COVID-19) has prompted some [students] to change their research focus'*, while another admitted that *'I am doubtful they will finish the final research paper, due June 5, 2020.'* Still yet, another of the lecturers cautioned that *'Some students are not participating in the sessions (they are non-responsive, hiding behind the technology)'*, which was also reflected on by another lecturer: *'Students have to be coping with their anxieties, jobs, health, families, etc. during this time of COVID-19, which is unsettling for effective learning to occur.'*

Research Question 5: How do university students' reported readiness for engagement compare with lecturers' views of the challenges that students experience with ERL?

After analyzing the quantitative and qualitative data sets, the results from each were compared at the point of interpretation to identify areas of convergence and divergence. In making the comparison, we found that the quantitative results provided insights into the lecturers' views about students' readiness for online learning and vice versa.

Convergence

The quantitative and qualitative results converged on several themes. The themes are: unstable Internet access, lack of basic access to devices, students' need for technical support, lack of access to appropriate workspaces for online learning, challenges with online study habits, and ownership of devices. There was divergence on one theme, namely, access to technical support (see table 6)

Unstable Internet access

The convergent data revealed that lecturers' concerns about students having "unstable internet" and "poor internet connectivity" were substantiated

Table 6: Convergence and divergence of quantitative and qualitative themes.

Quantitative (Students)	Points of interface: Themes	Qualitative (Lecturers)
<p>Access to Online Data</p> <ul style="list-style-type: none"> Approximately, 10.53% (n = 12) of the respondents indicated that they used only mobile data for accessing their online classes. 	<p>Convergence</p> <p>Unstable Internet Access</p>	<p>"Unstable WIFI access", "Wifi but not a biggy (had to send credit to two students ...)" and "Unstable internet service".</p> <p>"Some students have unstable internet connection"</p> <p>"They have issues with connectivity, limited data, and bandwidth. Quality of sound not always the best.</p> <p>A comment was made by one student that these challenges are compounded if you live in the rural areas."</p>
<p>Ownership of Own Devices</p> <p>Yes—91.67%</p> <p>No—8.32%</p>	<p>Convergence</p> <p>Lacked basic access to devices</p>	<p>"Some students do not have access to the basic or requisite technology (software and hardware) which is needed for online classes."</p>
<p>Ownership of Devices</p> <ul style="list-style-type: none"> Students owned multiple devices: Desktop, laptop and/other devices 113 (85.61%) <p>Ownership of Own Devices</p> <p>Yes—91.67%</p>	<p>Convergence</p> <p>Students owned multiple devices</p>	<p>"Some students had a problem with steady internet service or had to switch equipment, e.g., Moving from phone to computer or vice versa to access the platform. N.B. This group has previously used OurVLE/Bbc for class."</p>

<p>Access to Technical Support</p> <ul style="list-style-type: none"> • I have persons and/or resources nearby who will assist me with any technical problems I might have with my software applications as well as my computer hardware [M = 2.20, SD = 1.23] 	<p>Convergence</p> <p>Students needed technical support</p>	<p>"One student could not move from BBC to a document on OURVLE—reported that she could not find 'icons' on her tablet which would allow her to navigate without logging out".</p> <p>"Some students are unfamiliar with the technology [which, for some, this will cause them to be left behind, while with others, they will need far more processing time to develop their savvy]."</p>
<p>Access to Technical Support</p> <ul style="list-style-type: none"> • I have persons and/or resources nearby who will assist me with any technical problems I might have with my software applications as well as my computer hardware [M = 2.20, SD = 1.23] 	<p>Divergence</p> <p>Accessed technical needed support (through peers)</p>	<p>"Within this first week, I noted that when students were unsure how to do something (e.g., magnify a document or slide on BBC), other students were willing to jump in and share with students how they could do so even before I myself could assist. This collegiality and helpfulness was noted."</p>
<p>Appropriate Workplace</p> <p>I have access to...</p> <ul style="list-style-type: none"> • a private place (e.g., at home or at work) for online sessions that I can use for extended periods (M = 3.41, SD = 1.31) • adequate time that will be uninterrupted so that I can participate in my online courses (M = 3.22, SD = 1.38) <p>*Based on Holsapple's cutoff of mean score of 4, students lacked competent online study habits.</p>	<p>Convergence</p> <p>Access to appropriate workspace for online learning</p>	<p>"Some of the students' home spaces are inappropriate for online classroom instructions to occur effectively [because there are interruptions from family members such as children's background noises or jumping into the window frame, vehicular noises filtering in, sounds of pets/animals in the background]."</p>

(Continued)

Table 6: (Continued)

Quantitative (Students)	Points of interface: Themes	Qualitative (Lecturers)
Study Habits	Convergence	"I am doubtful they will finish the final research paper, due June 5, 2020."
<ul style="list-style-type: none"> I am proactive with tasks, tending to complete them well in advance of deadlines ($M = 2.86$, $SD = 1.12$) 	Challenges with online study habits	"Some students are not participating in the sessions (they are nonresponsive, hiding behind the technology)"
<ul style="list-style-type: none"> I am comfortable waiting for written feedback rather than receiving immediate verbal feedback. ($M = 2.73$, $SD = 1.17$) 		"Students have to be coping with their anxieties, jobs, health, families, etc. during this time of COVID-19, which is unsettling for effective learning to occur."
<ul style="list-style-type: none"> It is not necessary that I be in a traditional classroom environment to learn ($M = 3.00$, $SD = 1.31$) 		"Some students do not like online classes; they do not consider themselves as online learners"
Online Study Habits based on Holsapple's cutoff of mean score of 4, students lacked competent online study habits		"Given that a majority of the students have not done any online class, the not so strong ones will not participate adequately."
		"Several students across the three courses did indicate levels of anxiety and fear but for the most part, students were trying to be positive."

by the quantitative data. Twelve (10.5%) of the 132 students who responded to this item indicated that they had access to only mobile data.

Lacked basic access to devices

Concerning ownership of devices, 8.32 % of the students reported that they did not own any of the following devices—desktops, laptops, tablets, or phones. The lecturers expressed concern that some of the students do not have basic or requisite technology (see table 2).

Students need technical support

The quantitative report suggested that students lacked technical support from home in the event of experiencing technological challenges. Lecturers expressed concern that students experienced issues with particular technology hardware and software.

Divergence

There was one point of the interface between the quantitative and qualitative results, which was divergent. On one hand, quantitatively, students reported that they are not likely to have technical support in the event of challenges. On the other hand, some lecturers reported that students who had the technical know-how supported their peers who were technically challenged in their online classes.

Conclusion and discussion

This study aimed to compare university students' reported readiness for ERL based on their access to technology, along with their technical aptitude, online study habits and online learning lifestyle with lecturers' views of the challenges that students experienced with the transition to ERL. The majority of students' self-reports indicated that they were technologically prepared, but lacked the requisite technical aptitude, online study skills and online learning lifestyles for engaging in online learning within the context of ERT.

A comparison of the students' responses and lecturers' views of students' issues highlighted several points of convergence. First, as it relates to technological readiness, in keeping with previous research (e.g., Beaunoyer et al. 2020), the results of this study show that a small, but critical percentage of students did not own their own device and used only mobile data for their online classes. This finding aligns with faculty

concerns that some students did not have access to the basic or requisite technology (software and hardware) needed for online classes. Students caught in the digital divide are at a distinct disadvantage because of crises, such as the COVID-19 pandemic (Gay 2020). Those with secure Internet access and high-quality technology will excel in learning, while those who do not face learning difficulties (Holmes & Burgess, 2020). These students are at risk in the online delivery of the classes, since not having a device of your own may negatively affect a student's ability to attend and participate in classes as well as to complete assignments that require the use of online resources. In addition, the use of only mobile data for engaging in the different components related to online learning could prove to be expensive and perhaps unsustainable for university students in a developing country (Rasouli, Rahbania, and Attaran 2016).

Amongst the four ways students used to access the Internet, the residential access network was the most popular. A residential access network is very likely superior in terms of cost, flexibility and reliability, and therefore, it is a favourable finding that most of the study's respondents used this means to connect to the Internet. Notwithstanding this, the lecturers raised issues relating to the reliability and stability of the Internet connections students were using. This is not wholly surprising, since in Jamaica, such as other developing nations, although students have access to the Internet, there have been major issues relating to Internet reliability depending on the Internet service provider, where a person resides (urban, rural or deep rural), the availability of electricity and/or inclement weather that could potentially negatively impact students' online learning engagement (The Gleaner November 8, 2019a, October 4, 2020, Gay 2018, Beaunoyer, Dupéré, and Guitton 2020). This suggests that there may be other considerations related to technological preparedness beyond availability of devices and/or access to the Internet that future research could explore. In addition, since ERL in relation to the COVID-19 pandemic is still ongoing one year, since the first case of the SARS-CoV-2 disease was discovered, future research could also examine how students' preparedness have evolved over the year and students' experience in online learning within an ERL context.

Third, Martin, Stamper et al. (2020) reported that finding quiet spaces without distractions was a major challenge for students who studied online. This finding was supported in this study. The survey respondents who were not ready for ERL indicated that they lacked a private space or adequate uninterrupted time to study. Lecturers' views of students'

issues supported these findings by observing that students had interruptions from family members and the environment which were inappropriate for online teaching and learning to effectively occur.

Fourth, studies have indicated that students who were not ready for ERL were more susceptible to missing deadlines and were not effectively participating in online instruction (Malan 2020, Martin, Stamper, and Flowers 2020). The results of the survey indicated that some students were not proactive with tasks and failed to complete assessments by deadlines. This was also supported by lecturers who were doubtful that their students could finish their assessments by the expected deadline.

This study has implications for institutional, lecturer and student readiness. The data (quantitative and qualitative) highlight gaps in student readiness for online learning signalling equity issues. In education, the minority is just as important, as the majority and an education institution has a fiduciary responsibility to their students to ensure that all students benefit from the service provided. There is also the need for lecturers to reassess their pedagogical strategies and decisions for students' online engagement given the low levels of preparedness reported by some students and reinforced by the lecturers. On the spectrum of the students and their levels of readiness, the onus cannot be that of solely the students or the lecturers or the institutions; it has to be a shared, collaborative and community endeavour.

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Applying Mixed Methods Research to Inform Broadcast Media Regulation: A Reflection

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Abstract

This paper reflects on the implementation of a mixed methods study commissioned by a regulatory body in an independent English-speaking Caribbean territory. The mixed methods study, which was formulated with a convergent design, is reviewed to explain the process of conceptualizing an appropriate approach in relation to the goals of the study. The implementation of the study is outlined, and a reflection on lessons learned from conducting an applied research for a client is explored. Although the research was initially approached from the vantage point of the relative independence of each method employed, as the study unfolded, the merits of a more integrative orientation towards the mixing of methods, and a paradigm that could inform it became evident. This paper argues that mixed methods research is a valuable platform for the development of diverse communities of practice, especially in settings of limited resources and expertise.

Keywords: mixed methods research; applied research; convergent design; media regulation.

Introduction

Monitoring and regulating the rapidly changing media landscape continue to present challenges for many regulatory bodies worldwide. The media regulator needs to know the types of programmes being broadcast on local radio as well as on local free-to-air and cable television stations. Agencies charged with regulating media also need to know whether

media programmes meet the relevant technical, programming and service standards. In addition, it is important for the media regulator to gain an understanding of not only the electronic media sector's needs and expectations, but also audiences' expectations of the media and their perceptions of media regulatory issues, such as the implementation of programme ratings. All this is in an effort to inform media policies and plan strategically for a changing media environment.

The information needed by regulators may be found in various places, in diverse formats—different producers create content available on different platforms, disseminated using disparate channels, accessed by various audiences with different needs in different locations. In order for regulators to carry out their function, they require access to data from all those seemingly separate but interrelated sources: media producers, content and audiences. It is also important for regulators to have access to data, so that they may understand the needs of their stakeholders and ensure that these are represented or reflected in media policy deliberations. The feedback required by the media regulator must be derived from these varied sources, if, as an organization, it is to remain relevant and effective (Miller 2006). Arguably, this suggests the use of various research methods that can facilitate a more consultative, inclusive, and participatory approach to informing the media regulator who operates in an ever-changing media sector landscape. Ultimately, using multiple research approaches may contribute to the development of an encompassing and robust regulatory media framework.

In addressing the need for data, one regulatory body operating in an independent English-speaking Caribbean territory commissioned a study to find answers to a diverse range of questions relevant to the regulation of the broadcast sector. In keeping with the client's preference and in light of the magnitude of the study, the lead investigator assembled a multi-skilled research team comprising six researchers working in a single university. From early in the planning process, it was recognized that the study should include quantitative and qualitative methods. A project manager was responsible for coordinating all aspects of the study, including timeline, personnel and budget, as well as liaising with the client and other stakeholders.

This article reflects on the process and considerations involved in the study's design, outlines how the study was implemented, and evaluates the lessons learned from conducting mixed methods research. Implications for the conduct of future mixed methods studies in

resource-strapped contexts are posited, with reference to the role of paradigm in informing the research process through its duration.

Designing the Mixed Methods Study

The study was a mixed methods investigation, which according to Creswell and Plano Clark (2018, 5–6) is an approach that “collects and analyzes both qualitative and quantitative data rigorously in response to research questions and hypothesis, integrates (or mixes or combines) the two forms of data and their results, organizes these procedures into specific research designs that provide the logic and procedures for conducting the study, and frames these procedures within theory and philosophy”.

Qualitative methods (focus groups and semi-structured interviews) and quantitative methods (surveys and a content analysis) were administered to answer the eight research questions posed by the client (see table 1) which were analysed separately (Creswell and Plano Clark 2018, 5–6), after which the results were integrated and reported in an explanatory sequential joint display format (Guetterman, Fetters and Creswell 2015, 554–61). (Details of the study method are captured in the next section.)

The particular iteration of the study design chosen corresponds to Creswell and Plano Clark’s (2018, 5–6) convergent design in which the quantitative and qualitative data are analysed separately and then brought together for comparison and interpretation. The need for comparison and contrast in research is achieved by triangulation—the process by which more than one method (usually quantitative and qualitative) are used in research to validate the results and reduce methodological bias (Johnson, Onwuegbuzie and Turner 2007, 112–33). Triangulation by means of a convergent design was conceptualized at the outset of the investigation and formed the basis for the recruitment of a team with diverse research skills. However, two points may be made about the idea of ‘design’, because, as Schoonenboom and Johnson (2017, 107–31) note, design-as-process and design-as-outcome are linked but distinct. First, design-as-process included an awareness of theoretical resources that inform quantitative and qualitative research but probing the philosophical ground from which to build the mixed methods study unfolded gradually. Second, although the study components were planned in advance, at key points, additional approaches to data gathering were included to address gaps, leading to an ‘emergent aspect’ within what was, overall, a fixed method design (Creswell and Plano Clark 2018, 5–6).

Table 1: Research Questions.

Research Questions	Multimethod design		
	Quantitative	Qualitative	Mixed
1. What is the output of the electronic media sector?	Content Analysis	-	-
2. What types of TV programmes are the media audiences watching on local free-to-air and cable television stations, and the Internet?	Survey (face to face and online)	-	-
3. What types of radio programmes are media audiences listening to on local stations and the Internet?	Survey (face to face and online)	-	-
4. What kinds of local television and radio programmes do media audiences want to see and hear?	Survey (face to face and online)	Focus Groups with select demographic profile	Sequential explanatory design (face to face survey followed by focus group)
5. Are respondents aware of the regulator and its role?	Survey (face to face and online)	Focus Groups with select demographic profile	Sequential explanatory design (face to face survey followed by focus group)
6. Do respondents understand the regulator's role and functions?	Survey (face to face and online)	Focus Groups with select demographic profile	Sequential explanatory design (face to face survey followed by focus group)
7. What do audiences think of the television programme codes and ratings?	Survey (face to face and online)	Focus Groups with select demographic profile	Sequential explanatory [QUAN – qual] design (face to face survey followed by focus group)
8. How do local media managers view the regulator's work?	-	Semi-structured Interviews	-

The research team opted for a mixed methods approach for three key reasons: (1) as a pragmatic response to the need for access to diverse forms of data, for example, information about audience needs and expectations, programming output, and perspectives of media owners; (2) to explore different ways of knowing the terrain of electronic broadcasting rather than relying on one research tradition or method alone; and (3) to develop a rich and nuanced knowledge of the phenomena under review. These research goals had to be balanced with the goal of meeting the needs of the client, whose primary concerns were to ensure that the findings would contribute to solving "real world" issues (Fielding 2010, 127-38; Kaushick and Walsh 2019, 255; Frey, Botan and Kreps 2000). The justification for the chosen research approach aligns with mixed methods literature which highlights the importance of corroboration of results across data sets, the need for more thorough-going explanations of early data, and the inclusion of participants for certain kinds of research (Creswell and Plano Clark 2018, 5-6; Greene, Caracelli and Graham 1989, 255-74), among other goals.

Schoonenboom and Johnson (2017, 2) posit that "mixed methods is the sibling of multimethod research", and it can be advanced that the research team 'switched siblings' (conceptually if not in practice) during the implementation of the study. Some exponents treat multi- and mixed methods research as separate concepts, emphasizing the former as having distinct and independent quantitative and qualitative projects with their own worldviews (Ventakesh, Brown and Bala 2013, 21-54; Bryne and Humble 2007, 1-3; 189-208). The initial research design was informed by the notion of quantitative and qualitative components being conceptually distinct with separate methodological and operational processes, and this idea harmonized with the ways in which the distinct skill sets within the team would be used. However, the team noted that some authors use the terms multimethod and mixed methods research interchangeably (Bryman n.d., 1-12; Mingers & Brocklesby 1997, 489-509; Teddlie & Tashakkori 2003, 1-42), and that there was a valid argument for placing greater importance on establishing purposes, points, and scope of mixing of research methods, than on classification (Johnson, Onwuegbuzie and Turner 2007, 112-33).

Although the research was initially approached from the vantage point of the relative independence of each method employed (189-208), as the programme unfolded the merits of a more integrative orientation towards the mixing of methods became evident. In light of the range of research tasks being attempted, and the need for a measure of risk-taking and

flexibility (Bazeley 2003, 117–26), the practicality of the “third paradigm” of mixed methods emerged and was adopted (Denscombe 2008, 270–83; Johnson, Onwuegbuzie and Turner 2007, 112–33). This conceptual agility was both pragmatic and necessary to complete the programme of research satisfactorily, but had implications for centring the philosophical stance for the investigation as it proceeded (Morgan 2014, 1045–53), a matter that will be discussed in the Reflection section.

In sum, it could be advanced that methodologically and operationally, the study had always been designed to incorporate quantitative and qualitative stages, but an informing philosophy to undergird research activities was understood partially and incrementally as the study unfolded.

Description of Mixed Methods Research Design

The study’s mixed methods design was meant to serve the multiple lines of inquiry posed for the applied research. The breadth of the study was driven by the range of issues for which the client needed information. Eight disparate questions (see table 1) formed the research agenda for the study (Onwuegbuzie and Leech 2006, 474–98), with such issues as information about the programmes being broadcast in the sector, the types of programmes audiences watched and listened to, and general awareness of the regulator’s role and functions needing data. Given the project’s goal, the team used a pragmatic perspective that would address the client’s needs and leverage the quantitative and qualitative leanings of each team member.

The study used a convergent mixed methods design deploying quantitative and qualitative methods over an eight-month data collection period (Creswell and Plano Clark 2018, 5–6) (see figure 1). The research methods included a national quantitative survey (using both face-to-face and online data collection modes); a quantitative content analysis of programmes aired by the electronic media sector; focus group discussions with specially selected media audience members; and semi-structured interviews with media managers. The convergent design also included an explanatory sequential component nested within it—a quantitative stage (the face-to-face survey) from which a qualitative stage (five focus groups) was derived. This nesting of the explanatory sequential aspect within the overarching convergent design occurred when survey respondents indicated that they would be available as participants in follow-up focus groups, also referred to as inter-method mixing (Creswell and Plano Clark 2018, 5–6; Khoo-Lattimore, Mura, and Yung 2019, 1531–50)

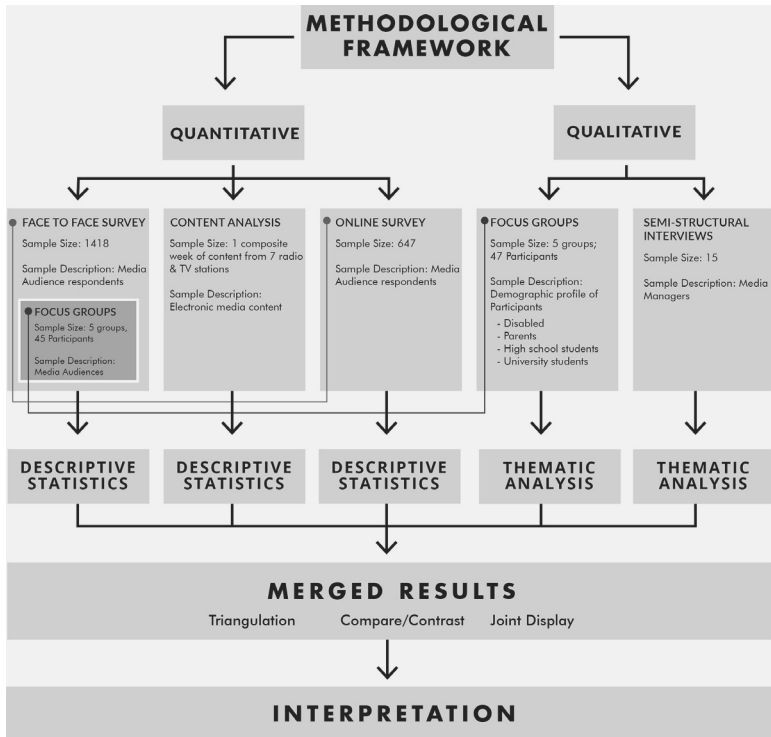


Figure 1: Methodological Framework

(see figure 1). The study featured intra-method mixing in which the quantitative survey instrument included closed and open-ended questions (Khoo-Lattimore, Mura, and Yung 2019, 1531–50; Vitale, Armenakis, and Field 2008, 87–105).

Each of these methods is discussed below.

Quantitative

For the quantitative component of the study, three methods were used. Based on the research aims, a mixed survey instrument (Khoo-Lattimore, Mura, and Yung 2019, 1531–50; Vitale, Armenakis, and Field 2008, 87–105) was developed, which answered research questions 2 to 7 (see table 1). The face-to-face survey was based on a nationally representative sample targeting 1,500 respondents and was fielded over a two-month duration. The face-to-face survey design employed a multistage sampling approach to derive a national sample drawn from respondents based on residency in the first

stage—capital city, main towns, rural towns and rural areas—and age, gender and socio-economic status in the second stage. Respondents were approached in such areas as shopping malls and shopping centres. The survey instrument consisted of seventy-seven closed, open-ended, and multiple option questions. The survey had a response rate of ninety-five percent ($N = 1,418$) (BCJ 2013).

In addition to the face-to-face survey, an online survey was fielded through Qualtrics to augment the overall survey response rate. The online survey remained active for participants to complete over a five-month duration. The online survey was done, because one of the research objectives related to the use of the online media. The online survey was also done to add value to the responses gleaned from the field survey and to assess if online respondents had different media behaviours when compared to the field respondents. The online survey (incentivized with access to credit for prepaid cellular phones on completion of the online survey) was disseminated via a link on select websites. A link to the survey URL was also shared on social media networks Facebook and Twitter. In addition, emails with the URL were shared with mailing lists of potential respondents. Eight hundred and eight (808) persons attempted the survey, with 647 completing it—an eighty percent completion rate (BCJ 2013). The data were analysed using SPSS version 19 and descriptive statistics were presented. Although the results were combined to reflect an overall sample of 2065, field results and online results were also presented separately in appendices, as they were based on two different sampling techniques.

A content analysis was the third quantitative method used in the study. The content analysis was conducted by randomly selecting a sample of seven media entities, then recording alternative three-hour time slots of their broadcast content within each day for each entity over a composite seven-day week (Sunday to Saturday). Programming from two free-to-air television stations, two radio stations, and three local cable television stations was analysed over the seven-day duration, for a total of 591 h of broadcast content. The content analysis provided descriptive data on the range of programmes watched by audiences, country of origin of content, levels of violence and sexual content, and frequencies of advisories on televised content, among other issues. Descriptive statistics were presented after using SPSS to analyse the data.

Qualitative

Focus groups and semi-structured interviews were the methods employed for the qualitative component of the study. There were two focus group

administrations. The first occurred when forty-five (45) face-to-face survey respondents were assembled to discuss and elaborate on the quantitative findings in focus groups ($n = 5$). Teddlie and Yu (2007, 80) argue that "in sequential sampling, the sample evolves of its own accord as data are being collected. Gradual selection may be defined as the sequential selection of units or cases based on their relevance to the research questions, not their representativeness". This aspect of the study design was an explanatory sequential method in which a qualitative data gathering exercise was nested in a quantitative method which fell under a broader convergent research approach (Creswell and Plano Clark 2018, 5-6). The data were analyzed using Qualrus.

The second stage of focus group administration ($n = 5$) was conducted with individuals who fit select demographic profiles of interest to the research. The five demographic groupings totalling forty-seven participants included a set of parents, secondary level students, disabled persons, and two groups of tertiary level students. Each focus group discussion lasted approximately two hours yielding ten hours of data, which were transcribed and analysed using Qualrus.

For the semi-structured interviews, fifteen media managers were interviewed for the study. Approximately eight hours of interview data were collected. Qualrus was used to conduct thematic analysis of these data.

The data from both sets of focus groups and the interviews were integrated at the analysis, interpretation and reporting phases of the study (Curry et al., 2013; Schoonenboom and Johnson 2017, 107-31) and presented in an explanatory sequential joint display format in which the results from the entire study—quantitative and qualitative components—were merged in the report (Guetterman, Fetters and Creswell 2015, 554-61). This approach allowed the researchers to conduct a meta-inference of the outcome of the mixed methods investigation in which conclusions garnered from both quantitative and qualitative aspects were interpreted separately and integratedly (Creswell and Plano Clark 2018, 5-6) (see figure 2).

Ethical consideration

Verbal permission or the signing of an informed consent form was required from all participants to ensure that ethical standards and guidelines were followed. Participants were free to withdraw at any time, without penalty. Prior to implementation, the study, with its instruments, was

RQ5: Are [] aware of the BCJ and its role?

Over two-thirds (69.5%) of the sample knew that media content was regulated in [] (Table Q56, Appendix E); and approximately 52.9% correctly identified the Broadcasting Commission of [] as the regulatory body. Some respondents stated the names of individuals associated with the BCJ, such as []

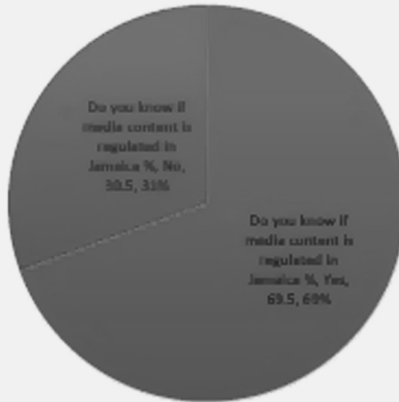


Figure 36: Responses to the question "Do you know if media content is regulated in Jamaica?"

In the focus groups persons were aware of BCJ's role, for example two participants voiced the following:

Asha: They monitor and regulate local media and make recommendations to the ministry.

B: ...I use to hear it and hear a lot about it [BCJ] because I use to listen Zip as well – so when the DJ's would play songs and a curse word would slip or whatever – so probably that's one of the first time I heard it – it was this one big thing when one of the DJ's let a curse word slip – ahm there was this big notice on Zip saying that the Broadcasting Commission is now clamping down on this DJ so that's about it – yeah that's how I heard about it.

Figure 2: Explanatory Sequential Joint Display

reviewed and approved by the ethical review committee of the university to which the research team members were employed.

Reflection

The goal of this paper is to highlight the value of mixed methods research, to reflect on the design and implementation of a particular mixed methods study commissioned by a client, and to identify some of the

lessons learned. To accomplish this, the authors have chosen to highlight five aspects—the applied nature of this specific research, the importance of research parsimony, the experience with drawing inferences from the data, the role of paradigms in shaping mixed methods research, and the value of research communities of practice. The implications for the conduct of future mixed methods studies in resource-strapped contexts are also noted.

Mixed Methods as Applied Research

For research that is commissioned, the imperatives of the client's research requirements usually guide all facets of the study. For some researchers (e.g., Kelle 2001) client-led, problem-focused projects, such as the one discussed in this article, are not suitable for mixed methods research, because they tend not to be theory-driven. However, there are others who argue that applied research that is problem-focused and examines social realities is ideal for a mixed methods approach (Fielding 2010, 127–38; Kaushick and Walsh 2019, 255). In addition, Biesta (2003, 95–118) notes that determining whether a study's purpose can combine technical and cultural roles is an important issue for mixed research. In the case of the study under review, the research problem, which related to a set of issues around which the broadcast regulator needed data rather than any particular philosophical orientation, guided the design of the study (Niglas, 2004). Therefore, this study presents a new account of the application of mixed methods to applied research.

Balancing Possibility with Parsimony

A cluster of factors made a mixed methods investigation the ideal option to answer the questions posed by the client—the need for data from diverse contexts, the availability of researchers with a range of requisite skill sets, and the importance of national stakeholder engagement to the overall purpose of the research. Since all members of the mixed methods research team were associated with a university, the additional impetus of augmenting scholarly output from participation in the study made involvement in a mixed research design attractive.

However, a lesson learned from the experience is the importance of designing a mixed methods study in the most parsimonious way, so that time, resources, and expertise are used wisely. As with most studies of this kind, the team discovered that delays and hindrances are hidden across the life-cycle of the research, which in this case included a sluggish uptake

of the online administration of the survey, attrition of survey respondents who had volunteered to participate in forthcoming focus groups and an unexpected general election which halted both the quantitative and qualitative stages of the study.

Although resources and expertise may be available to mount a mixed methods study, exploring the most efficient option among the range of study variants that can achieve the goal is recommended (Creswell and Plano Clark 2018, 5–6).

Inferences Drawn from Data

The study generated numeric data from the quantitative survey, which was conducted both as face-to-face and online activities, and the content analysis. The qualitative methods, which generated descriptive thematic explanations, comprised focus group sessions and expert interviews. By triangulating the quantitative and qualitative data (Johnson, Onwuegbuzie and Turner 2007, 112–33), multiple and intersubjective perspectives of a topic that had so many dimensions were able to be integrated in the interpretation phase. Teddlie and Tashakkori (2009, 387) refer to the process of assessing the meaning of the data within and across datasets as drawing inferences and meta-inferences. For example, in the study, it was discovered from the quantitative data that approximately seventy percent of survey respondents used the television programming code. However, the focus group with parents revealed that some did not fully understand some of the codes. Comparing results across the quantitative and qualitative data showed that the use of the television code did not necessarily equate with parental understanding of its rating criteria, and this additional information was useful to the client. In another example, the content analysis provided a statistical description of programme output on local television and radio, which was validated by both industry players and audience members in survey results and interviews. Furthermore, the open-ended questions in the face-to-face and online survey allowed respondents to name media content that they enjoyed, which provided meaning to the descriptive statistics generated by the content analysis—describing not just the programming available on the air, but also the kinds of programmes audience members were watching or listening to (BCJ 2013). A third example of the value of integration of data sets is illustrated by comparison between respondents' knowledge of the role of the regulator and focus group members' recollections of regulation in action. Survey results indicated that fifty-three percent of respondents could correctly

identify the regulator and its role, while participants in the focus groups were able to cite situations when breaches by media entities brought sanctions from the regulator (see figure 2).

Although the client was satisfied with the presentation of the data, the level of meta-inference assembled from the data did not capture the range of possibilities available in mixed methods studies, for example, data transformation, typology development, or extreme case analysis (Caracelli and Greene 1993, 195–207). Insights gleaned from the mixed methods concentrated on corroboration and complementarity (Greene et al., 1989, 255–74)—as in the example of the use and understanding of the television code. The study under review satisfied the needs of the client, but given the investment of time, resources and expertise involved in conducting mixed methods studies, a consideration for researchers is whether the wealth of data generated justifies the cost, and whether the breadth and scope of inferences available have been sufficiently and appropriately engaged.

The Role of Paradigm in Applied Mixed Methods Research

The intent of the study was to provide answers to eight questions about the media broadcast context in a Caribbean country. The diversity of questions aligned with the utility of the mixed methods approach and led to a pragmatic stance in how the investigation was designed (Creswell and Plano Clark 2018, 5–6; Onwuegbuzie and Leech 2006, 474–98). Although the integration of quantitative and qualitative methods in a study is an accepted research approach (Tashakkori and Teddlie, 1998), some researchers have observed that overlooking the paradigmatic bases for mixed methods is problematic, especially for novice researchers (Shannon-Baker 2016, 319–34; Morgan 2014, 1045–53; Niglas, 2009). Paradigms, which Morgan (2007, 53) defines as the “shared beliefs within a community of researchers who share a consensus about which questions are most meaningful and which methods are most appropriate for answering those questions”, have implications for method design, implementation and reporting (Shannon-Baker 2016, 319–34). Pragmatism’s “outcome-oriented” stance has made it a useful paradigm in mixed methods (Shannon-Baker 2016, 319–34; Johnson, Onwuegbuzie and Turner 2007, 112–33), but Morgan (2014, 1045–53) argues that pragmatism has become tethered to the idea of practicality, which dilutes its importance in research more generally.

It might be argued that the research team 'tumbled into' pragmatism as an informing framework for the mixed methods study serendipitously, driven in part by client needs and in part by the emergent nature of the design. These requirements drove the "how to" of the study, which Morgan (2014, 1045–53) asserts reduces pragmatism to a base level. As noted earlier, the research team initially conceptualized the study as having distinct methods which were independent of each other, but eventually recognized the value of and complexity associated with mixed methods as the research planning unfolded. This broadening understanding of the mixed methods approach came with an appreciation for its philosophical underpinnings, which opened up new possibilities in how the study could be designed (Morgan 2014, 1045–53; Shannon-Baker 2016, 319–34). Two methodological integrations were spawned by the impetus to deepen the possibilities of the study—the implementation of an online survey to complement the face-to-face survey administration, and the implementation of focus groups (qualitative) nested within the face-to-face survey (quantitative).

Although balancing the needs of the client was paramount in this study, a lesson learned is that discussions around paradigms may be useful at the outset of a research programme, thus giving members of the research team the opportunity to reflect knowledgeably on their own theoretical positions and to establish the breadth and rationale for mixing methods prior to implementation, for a more robust explanation of results at the end (Shannon-Baker 2016, 319–34).

Developing research communities of practice

The development of research communities of practice is connected to the mixed methods approach, as it provides the social and communal environment in which intellectual pursuits flourish. Communities of practice are groups of people who collaborate on specific research-related activities in informal, mutually beneficial ways. The groups usually vary in size, configuration, and longevity, and indeed, individuals may belong to several communities simultaneously (Denscombe 2008, 270–83). Although the building of institutional capacity is an important aspect in the conduct of multimethod research, nurturing an ethos of the acquisition of knowledge as a shared goal is also important:

Compared with formal groups created within organizations, whose structure, tasks, and identity are established through functional lines and status hierarchies, communities of practice hinge on the fact that they

can and do transcend boundaries of departments, organizations, locations and seniority ... what bring them together as a community, is that they share a common purpose (Denscombe 2008, 276–77).

In the study under review members of the research team experienced a level of shared interest in the project that was sustained for the life of the study, with some forms of collaboration being maintained after the study. The culture of shared knowledge generation is particularly important in research settings where financial resources are tight, and where the expertise needed in a significant project may best be drawn from an affiliate department or organization. Moreover, a community of practice can widen the usual borders of the research group by providing opportunities for a range of participants—including staff members who would otherwise be peripheral to research—to contribute to the study. The inclusiveness that can occur in these kinds of situations is of particular importance in universities where financial and other resources may be scarce, and where sharing in a common purpose may be the only way to get the job done.

Conclusion

This paper presented a reflection on the design and implementation of a mixed methods study commissioned by a regulatory body. The process of arriving at a convergent mixed methods design was outlined, and the implementation of the study described. In the reflection section, issues related to the application-driven intent of the research, ensuring parsimony in research design, drawing inferences from the data, and the role of paradigm in research design are explored. The benefits of building a strong community of research, particularly in resource-strapped settings, are also discussed.

The reflection process may be beneficial to both experienced and novice researchers, as they learn how to use lessons from the past research efforts to inform future research plans involving mixed methods. The completion of a mixed methods study, despite its challenges, suggests that the use of diverse approaches to address the research needs is not only possible, but also desirable. In limited resource environments, multidisciplinary research teams can be ideal for the efficient use of scarce resources, such as specialized knowledge and funding. Reflecting on the research process of studies of this kind provides a guide to researchers who may choose to collaborate on mixed methods projects in the future.

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Agency: Students Assuming Ownership of Their Learning in a Foundation Writing Course Designed for Science and Technology and Medical Sciences Majors

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Abstract

Although foundation writing courses are mandatory for students pursuing studies at a tertiary-level institution in Jamaica, it is not unusual for administrators and facilitators to hear at student-staff liaison meetings and in other contexts that some Science majors think they should be exempt from the course that was designed for them. Some of these students believe that they do not need writing to complete their degrees. However, this is against their better judgement. Science students, like their counterparts in other faculties, need to develop mastery in the application of composite critical literacy skills: interpretive reading, good writing, analytical viewing, informed speaking, active listening and critical thinking. It is incumbent on Science students to assume responsibility for their learning. Grounded in metacognitive theory and principles of self-monitoring, self-regulated learning, student ownership, student-centred learning and student engagement, the purpose of this semester long mixed methods case study was to discover if the participants' application of agentic strategies would yield positive outcomes. Data were collected from the participants' initial and final reflections, observations, group and individual conversations, researchers' anecdotal notes and questionnaires. During the study, the majority of the students identified and owned concerns they experienced with critical reading and writing. Recognising that these difficulties could create barriers to their attainment of success in their tertiary-level education and careers, the majority committed to purposefully engaging in the course. The findings indicate that though complex, the agentic approach to critical reading and writing instruction at the tertiary level can yield positive outcome if students meaningfully engage with their peers and instructors and are taught how to reflect and implement self-monitoring and related agentic strategies.

Keywords: student agency; ownership; student engagement; student-centred learning; students' writing experiences.

Introduction

'Renewed international interest in Writing Across the Curriculum (WAC) is testimony to a growing acknowledgement that writing plays an important role in all areas of the curriculum' (Taylor 2016, 97). This assertion is clear in its intent to promote writing as a skill that has global significance. Yet, over the years we the researchers (course coordinator and lecturer, respectively) have observed in our teaching practice that some Science and Technology and Medical Science students (referred to hereafter as Science students) who pursue undergraduate degrees at a Jamaican tertiary-level institution, strongly assert that they should not be required to do a foundation writing course because they are of the view that they do not need writing to complete assignments for their majors. Some, especially medical doctors in training, believe that the skills that the course aims at developing are not vital to their careers (Taylor, quoted in Jones 2021). In fact, we have also observed that not being aware that their foundation writing course uses cumulative assessment, some of these students stop attending lectures and seminars early in the semester, only to discover at the end that it required consistent engagement. They usually regret their folly when they obtain mediocre or failing grades. When this is the fate for students who are on scholarships or those who need to pass that one course to be awarded their degrees, they are usually remorseful.

This was the case for a female student who had not completed her foundation writing course five years after her cohort graduated. When she turned up at the institution in October 2020 to make queries about why she was not awarded her degree in 2015, she started blaming the institution, the course and the facilitators, instead of accepting her tardiness and lack of engagement. The carefully kept records were checked, and it was discovered that after completing the first low stake assignment, she disappeared. She was most displeased when she learned that the only way of completing her degree was to pursue the course. By that time, the semester was far gone. Again, lack of engagement further delayed the awarding of her degree. Even then, she still held the view that she was being inconvenienced because of a course that she did not need for her medical practice.

In another instance, after completing his studies and having practised for two years, another Medical Science student expressed the desire to further his development in writing. He aspired to embark upon a research

and writing career path and felt the need to solicit help. He realized that he could not have left it up to chance; rather, he became proactive in his quest for learning to write well.

Reflecting on matters concerning the building of his credibility and his attainment of success in the field of Science, from as early as three centuries ago, American author, Cathell (1895) implied that the world respects people who write. He cited two lines eloquently quipped by Sheffield in 1723, 'Of all those arts in which the wise excel/Nature's chief masterpiece is writing well' (88). Today, writing well' still has relevance in private and public spheres (McLaren 2012; Milson-Whyte 2015; Jones 2016; Taylor 2016).

In academia and other sectors, writing is like prime land that is solidly developed 'real estate'; the value does not depreciate. Rather, it accelerates; it is a secure asset, a lifelong investment. Considering these invaluable 'properties' of writing, student agency is one rewarding and practical strategy that can be employed to foster Science undergraduates' engagement in, and commitment to obtaining mastery in it. Conscientious application of principles of student agency has the potential of making Science students achieve competence in writing, a firm foundation on which they can gradually build their intellectual structures, which can help them to stand tall like ancient Egyptian pyramids in academia, their chosen careers and beyond. It was against such a background that this study was conceptualized.

Conceptual framework

During the initial stage of the research, we considered the aims and outcomes of the course designed for the Science students.

Course aims

- To provide students with the techniques and skills to read and comprehend materials in the natural and health sciences.
- To develop student's ability to produce writing suitable to occasion and genre.

Learning outcomes

Students who complete the course successfully should be able to:

- Read, understand, summarize and evaluate scholarly materials in medicine and the sciences.
- Design an effective question or choose an appropriate topic and a method for a project in their discipline.

- Evaluate, use and document sources appropriately, including electronic databases bibliographies and other information sources.
- Use a process approach to produce research reports or essays independently and in collaboration with peers.
- Participate in oral, written and online exchanges with peers (and tutors) (Department of Language, Linguistic and Philosophy 2019).

In establishing the purpose for our research, we were curious about making discoveries about student agency in critical reading and writing instruction at the tertiary level. Figure 1 is a basic representation of our initial conceptualization of the research:

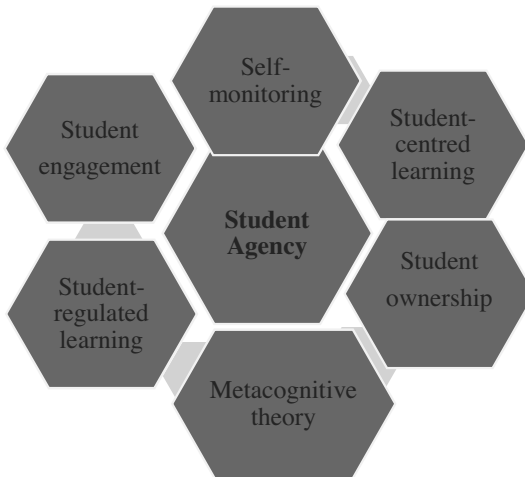


Figure 1: Initial conceptualization of research

We intended to examine multiple perspectives on student agency in the delivery of a tertiary-level writing course to Science students. Therefore, in this section, we focus on student agency and, thereafter, provide brief information on its relation to metacognitive theory. Perspectives on self-monitoring, student-regulated learning, student-ownership, student-centred learning and student engagement are also discussed.

Student agency

Student agency is a terminology that spans across disciplines and has held pride of place in the field of education. Works done by scholars on student agency have attested to its contribution to students' holistic development (Bandura 1993, 2006, 2008; Barton and Tan 2010; Freire 1993; Klemencic 2015; Vaughn 2014; Williams 2017; Zeiser, Scholz and Cirks 2018).

Recurring themes in these works include self-efficacy, resilience, ethical responsibility, ownership, student-centred learning, student engagement, dependence, interdependence and student-directed learning. Three explanations of student agency were selected for this study.

Foremost, Bandura (1993) stated that student agency is about students playing active roles in their learning. They are mindful of their circumstances, talents, weak areas, environments, goals, support systems and human and material resources and consistently use them to maximize their academic potential. For Bandura, this requires efficacy. He explained:

There are three different levels at which perceived self-efficacy operates as an important contributor to academic development. Students' beliefs in their efficacy to regulate their own learning and to master academic activities determine their aspirations, level of motivation, and academic accomplishments and the level of academic progress ... (117)

The second is a view of student agency through theoretical lenses defined by Klemencic 2015:

Drawing from social cognition theory and sociological theories of human agency, student agency is conceptualized as a process of student actions and interactions during studentship, which encompasses variable notions of agentic orientation ('will'), the way students relate to past, present and future in making choices of action, and of agentic possibility ('power'), that is their perceived power to achieve intended outcomes in a particular context of action and interaction, but also to self-engagement of a critical reflexive kind. (16)

The third is an abridged version of the description of student agency by Core Education (2021):

The first is that agency involves the initiative or self-regulation of the learner. Before learner[s] can exercise agency in their particular learning context[s] they must have a belief that their behaviour and their approach to learning [are] actually going to make a difference for them...Second, agency is interdependent. It mediates and is mediated by the sociocultural context of the classroom. And third, agency includes an awareness of the responsibility of one's own actions on the environment and on others... Every decision a learner makes, and action she or he takes, will impact on the thinking, behaviour or decisions of others - and vice versa. (para 3-5)

Comparison of the explanations of student agency indicated that it involves deliberate choices that students make to assume ownership of their learning. Students are chief agents of change in their educational quests (Bandura 1993, 1999, 2008). They should not be treated as passive receptacles yearning the outpouring of teacher-generated knowledge (Freire 1993; Vaughn 2014). We see student agency as a complex concept that can be likened to the construction of ancient Egyptian pyramids as described

by National Science Foundation (2017). Individually and collectively, the Egyptians masterminded the timely and strategic construction of these sturdy and durable structures. From conceptualizing them – to excavating and putting their foundations in place-to the tactical laying of the stone walls – to the sealing of the capstones, they created masterpieces. By working independently and interdependently as necessitated by existing situations, they combined their mental, physical and emotional prowess and other attributes such as talents and expertise to achieve their goals. Similarly, with a sense of agency, Science students, supported by their peers and facilitators, can build bridges to monumental achievement in writing.

Student agency and Metacognitive theory

In relation to teaching and learning processes in tertiary-level writing instruction, there exists a strong link between student agency and the theory of metacognition because at their core are areas of commonality including self-monitoring, student-regulated learning, student-ownership, student-centred learning and student engagement. In his original work on metacognition, Flavell (1975) linked metamemory to people's propensity to purposefully guide or direct their train of thoughts to taking charge of any situation in which they find themselves. Flavell's theory of metacognition provides a frame from which we can understand student-initiated actions. Boston University (2021) provided a concise, yet comprehensive explanation of metacognition in relation to writing instruction at the tertiary level:

Metacognition is an essential part of writing instruction: with a metacognitive focus, we help students activate their prior knowledge; practice and apply new strategies for the writing and research process; reflect on their strengths and challenges during major assignments and articulate the differences between genres, disciplines, and courses. (para. 1).

This means that, equipped with appreciable metacognitive skills, tertiary-level Science students can strategically position themselves to evaluate the progress that they make in their foundation writing course. They can do this through self-monitoring.

Student agency and self-monitoring

Writing development for tertiary-level students is not only about the end product; it is more so about the journey. It is not about the grades that students attain at the end of their writing courses. It entails the invaluable transformation that takes place as these students' writing development unfolds. There is the need for these students to keep accounts of their writing development. A useful way of doing this is to do self-monitoring.

'Self-monitoring is a strategy that teaches students to self-assess their behavior and record the results' (Vanderbilt University 2021 para. 1). Self-monitoring, a precursor to self-reporting, is a useful tool for tertiary-level writing students. It enables students' ability to measure their progress and to get an informed understanding of what they need to do to achieve their long, and short-term writing goals. These could include matters concerning conventions of writing like generating and organizing ideas, use of grammar, sentence structure, analysis, appropriate use of information from sources and evaluation of information.

If tertiary-level students are aware of their writing goals and consistently use customized 'write-o-meters' to check on how they are doing with achieving them, they will not lose focus. According to Vanderbilt University (2021) self-monitoring has numerous benefits. It

- provides more immediate feedback to students than is possible when teachers evaluate the behaviour
- depicts improvement over time in behavior for both the student and the teacher who engages students
- facilitates communication among students
- increases students' awareness of their own behaviour
- produces positive results (Section 2)

These benefits are applicable to tertiary-level students in relation to their pursuit of writing courses. Therefore, self-monitoring is relevant to this study because participants assuming responsibility for their learning in their mandatory foundation writing course was the intent of the study. Self-monitoring is closely linked to self-regulated learning.

Student agency and student-regulated learning

Self-regulated learning plays pivotal roles in student agentic approaches to education. Referring to a LISREL model, Garcia and Pintrich (1991) defined self-regulated learning as, 'a behavioral constellation of monitoring, elaboration, and effort management strategies' (2). They further explained that among other things, student-regulated learning fosters students' self-efficacy, management skills and intrinsic motivation. These concepts are fundamental to tertiary-level student's success in writing. Bandura's (1993) explanation of self-efficacy is an important point of reference in this study because it highlights what tertiary-level students can do to benefit from student agency-driven writing instruction: 'Students' beliefs in their efficacy to regulate their own learning and to master academic activities determine their level of motivation and academic accomplishments' (Bandura 117).

Intrinsic motivation and effective management of resources are vital to the attainment of success in tertiary-level writing. Given that the foundation writing course that was studied, is offered in a 13 weeks long semester, if students learn to manage their time and other resources well, they can achieve success. Based on these perspectives, student-regulated learning is the fertile soil in which tertiary-level writing students, like seeds, germinate, develop roots and gradually grow, then burst through the ground and shoot for the limitless sky. This is more likely to come to fruition if they assume ownership of their learning.

Student agency and student ownership

Without student ownership, student agency would not yield favourable learning outcomes. Suggesting that student ownership is agentic and that in the final analysis it contributes to students' long-term accountability of their writing, Siedlecki (2021) wrote

What I have learned this year is that reading and commenting on an entire essay is counterproductive. I used to spend hours upon hours reading and commenting on student work. The result was usually students coming to me and asking what they could do to 'fix' their writing. They were seeing writing as a set of rules they did not know: right and wrong ways to write that could be 'fixed'. They were writing and revising based on my comments so that I would be happy with their work. In other words: I owned their product. **It was for me, not for them.** (para. 1)

This honest, powerful and authentic voice about writing pedagogy that emanated from current classroom practice is a pragmatic, interesting and instructive perspective which demonstrates that student ownership is related to student-centred learning, is an impressive example of reflective writing from a writing instructor. It can be equally powerful for Science students as they assume their roles in student-centred learning.

Student agency and student-centred learning

There is a close relationship between student agency and student-centred learning. Zeiser, Scholz and Cirks (2018) suggested that student-centred learning is a movement that has shifted the focus from the teacher being the sole authority in teaching and learning processes/classrooms. If there is any merit in McLaren's (2012) idea that writing to learn is essential to learning to write, then agentic writing instruction should be student-centred. Like Freire (1970), McCarthy (2015) thinks that in order to make student-centred learning truly agentic, facilitators need to step back from being the 'control centre' and 'centre control' and give their students the feather and ink they need to write and fly, whilst standing in the gap to

scaffold them by being the wind beneath their wings. McCarthy's take on student-centred learning is transferable to tertiary-level writing instruction:

Student-centered classrooms include students in planning, implementation, and assessments. Involving the learners in these decisions will place more work on them, which can be a good thing. Teachers must become comfortable with changing their leadership style from directive to consultative – from 'Do as I say' to 'Based on your needs, let's co-develop and implement a plan of action'. (4)

McCarthy's perspective underpins the importance of tertiary-level writing facilitators establishing and maintaining working partnerships with their students, and simultaneously inviting them to engage in their learning within and outside of the classroom. It is interesting that this writer pointed out that student-centred learning means more work for students because it is also not unusual for Science students at the research site to complain that their writing course requires them to do 'too much work'. Thus, in playing their roles in the agentic delivery of this course, instructors should tactfully educate their students about student engagement.

Student agency and student engagement

Like metacognition, self-monitoring, student-ownership, student-centred learning and student-regulated learning, student engagement is inextricably connected to student agency. Student engagement is more than students merely making themselves available and to participate in their learning. It is complex. Farrell and Brunton (2020) suggested that different factors affect the ways in which students engage in their learning. They listed some of these:

- structural influences such as course design significantly impact on their learning experience (3)
- socio-cultural influences including social inequalities, socio-economic backgrounds, identity, age and social class (3)
- ...psychosocial influences such as teaching support, motivation, skills and self-efficacy (4)

These factors mentioned by Farrell and Brunton are only a few, but they represent the multidimensionality of student engagement. They imply that the quality of student engagement is determined not only by the student, but also by other human as well as material resources. Human resources include support from family members, teachers, peers and administrators as well as creativity, the ability to listen and to detect signs in students who have learning concerns, empathy and innovativeness. Material resources

comprise books, electronic learning devices and physical and virtual provision of course materials made available by the teachers, institutions and government agencies such as ministries of education. There is a connection between ways in which writing courses are designed and delivered and students' engagement or dis-engagement (Farrell and Brunton 2020). Since course design and delivery are strong determinants of the outcome of student engagement, those aspects should be routinely scrutinized, aimed at promoting student agency.

The perspectives shared in this section confirm that there exists a link among student agency, metacognition theory, self-monitoring, student-ownership, student-centred learning and student-regulated learning. Student engagement and all of the related student agency-related concepts previously mentioned, have the potential of yielding positive outcomes in tertiary-level writing courses. Conversely, barriers to student engagement, metacognition, self-monitoring, student-ownership, student-centred learning and student-regulated learning are likely to affect student agency and its ability to contribute to learners' success.

Research design

Our deeper understanding of the foregoing perspectives coupled with the aims and learning outcomes for the critical reading and writing course led the selection of the research design that we thought was suitable for our research. First, we formulated the research questions:

Research questions

1. What are the concerns that the participants have prior to their engagement in the critical reading and writing course?
2. How do they plan to address their concerns critical during their pursuit of the course?
3. How do the participants self-monitor their progress while taking charge of their learning?
4. What is each participant's advice for prospective Science critical reading and writing students?.

As reflected in the research questions, we intended to get a comprehensive understanding of the use of agentic approaches in the delivery of the tertiary-level critical reading and writing course to the Science students.

Second, given this purpose, we thought that it would be useful to choose a design that would allow us to combine qualitative and quantitative (mixed methods) and research procedures. Studies done in other

contexts on tertiary-level writing courses successfully utilized mixed methods approaches (Bakla 2020; Hembrough and Jordan 2020). These researchers purposefully combined quantitative and qualitative approaches/perspectives in their collection, presentation and interpretation of data (Ponce and Pagán-Maldonado (2015).

We chose to do a 'fully integrated mixed methods' case study. A fully integrated mixed methods study is described by Schoonenboom and Burke Johnson (2017): '... mixing occurs in an interactive manner at all stages of the study. At each stage, one approach affects the formulation of the other, and multiple types of implementation processes can occur' (118). Works done by Merriam (1998), Stake (1995) and Yin (2002) are indicative of the usefulness of case studies in educational research. Liao and Li (2017) did a mixed methods case study to evaluate college English writing in China and found that it was an apt means of assessing learner outcomes.

We thought that a mixed methods single case study would be advantageous because it would provide lens through which we could identify and evaluate balanced research-based perspectives on student agency as applied to a group of thirty-seven students who were pursuing their mandatory critical reading and writing course. The case is bound by the fact that all of the participants were pursuing majors in the Faculty of Science and Technology and Medical Sciences at one tertiary-level institution situated in Jamaica. The delivery mode, content and assessment tools employed in the 13 weeks long critical reading and writing course were the same for the thirty-seven participants. As a result of these...., it was practical for us to use a single case design in our investigation on student agency

We used an integrative approach to conceptualize the single case study and grounded it in theoretical and multiple perspectives garnered from previous works done in other regions on student agency. Our rigorous interpretation of numeric and linguistic perspectives reported by the participants can be likened to 'filtering', 'combining' and 'refining' processes which created a 'single' voice with 'platinum' quality that gives 'weight' to Caribbean mixed methods research-based evidence on student agency.

Participants

The participants were thirty seven of 114 students who were enrolled in the seminars facilitated by the researchers (course coordinator and lecturer) for the second semester offering of the critical reading and writing course in the 2018–2019 academic year. Since the students were all expected to engage in the course individually and collaboratively, the integration of their perspectives on their experiences with agency in course

was fundamental to 'interpretive consistency during the meaning-making process' (Onwuegbuzie and Collins 2017, para 1).

Thirty of the participants were Jamaicans, three came from Trinidad and Tobago, two were Barbadians and one each from Dominica and St. Lucia. Twenty-five (67.6%) were pursuing their first year of tertiary-level education, 7 (18.9%) were in the second year of their programmes and 5 (13.5%) were finalizing students. Totally, 43.2 % of the participants were males and 56.8 % were females. The 13.6 % difference between the genders was not qualitatively significant because it did not compromise the intent of the study. The participants were given equal opportunities to report on their lived experiences in the course. Similarly, the differences in the numbers and age ranges of the participants, 26 (70.3%): 7–20 years, 10 (27%): 21–25 years and 1 (2.7%): 26–30 years, were not significant.

It should be noted again that the research was conducted at a tertiary-level institution situated in Jamaica, and this accounted for the greatest number 30 (81%) of the participants being from that country. However, Transcend Inc. (2018) suggested that student agency exceeds demographic, disciplinary and even inter-disciplinary boundaries. The majors declared by the participants are listed in Table 1.

Table 1: Participants' majors.

Major	Number
Actuarial Science	1
Anatomy	2
Bachelor of Medicine and Bachelor of Surgery	14
Basic of Medical Sciences	2
Biochemistry	4
Chemistry (General)	1
Computer Science	4
Diagnostic Imaging	1
Electrical Engineering	2
General Science	2
Geography	1
Pharmacology	1
Physical Therapy	1
Pure and Applied Sciences	2
Undeclared	1
N	37

A striking detail in Table 1 is that the Bachelor of Medicine and Bachelor of Surgery students accounted for the majority of the participants. The explanation for this is that according to institutional policy at the research site, these students take their critical reading and writing course during the second semester. Interestingly, the majors declared by 36 (97.3%) of the participants comprised 14 options. It can be supposed that the 37th participant (2.7%), who did not declare a major at the time when the research process started, was still contemplating which option to choose from the variety that was available. In the study, 14 majors, chosen by 36 students, had statistical significance because they represented the diversity that existed among the research participants. One of them observed this at the first seminar and commented on it in the initial reflection:

I came with an open mind set and a hardworking ethic. My colleagues and I have diverse backgrounds, but we will collaborate to attain the common good. At the end of the course, we will dispel the myth of hyper-individualism and reinforce the dogma of teamwork.

Like Viding (2019), this participant and his peers soon recognized the importance of diversity to the quality of work done by scientists. The manner in which these budding scientists would 'balance the constructivist focus on individual agency with their [diverse] social, cultural and political complexities and realities' (Hudelson, quoted in Panofsky et al. 2005, 17), would be discovered as their critical reading and writing course and the research unfolded. Rigorous procedures were utilized for the data collection, presentation and analysis.

Instruments

Data were garnered from observations, anecdotal notes and group and individual conversations in which the students engaged during seminars hours and consultation sessions as well as pre and post questionnaires (see the Appendix for copies of questionnaires). The questionnaires included closed and open-ended questions which made it possible for the participants to make qualitative and quantifiable responses. We believed that the use of a variety of sources would provide multiple perspectives, which would give us a more comprehensive understanding of student agency in the context of the critical reading and writing course we facilitated.

Procedures

Before the data collection commenced, we carefully checked the questionnaires. We also asked two colleagues to vet them. Additionally, the

questionnaires were administered to four former Science students to ensure that the instructions and items were void of repetition and ambiguity. Based on these students' feedback, minor changes were made to two items on Questionnaire 1 prior to its administration. The data collection started in the week of 28 January 2019, when the participants completed and submitted their responses to the first questionnaire and their initial reflections. Observational and anecdotal notes and proceedings from group and individual classroom and consultation session conversations were gradually compiled during the semester. The process culminated one week after teaching ended when the students submitted the completed Questionnaire 2 and their final reflections. This was done to give them ample time to think about their experiences with the agentic approach used in the course.

Data presentation and analysis

Techniques employed for the presentation and analysis of the research findings which emerge from mixed methods studies are vital to their reliability and rigour. The 'combination of data sources or conversion of data types to build a blended set of results' is one plausible option (Bazeley 2012, 814). We thought this model was appropriate for our fully integrated mixed methods single case study. Applying the principles to our analysis, we coded the qualitative data and concurrently integrated them with the numeric findings under themes formulated based on the research questions: 'Students' Critical Reading and Writing Concerns; 'Student Agents' Plans of Action; 'Self-monitoring of Progress and Student Agency' and 'Student Agency: Participants' Advice for Prospective Students. This integration helped us to generate and organize the findings from observations, anecdotal notes, group and individual conversations as well as the two questionnaires into a logical and coherent whole.

AQ1

To validate the findings, we used the substantive qualitative and quantitative findings selected and cross-checked repeatedly during the triangulation process to exemplify, illustrate and substantiate the claims from which conclusions were drawn (Bazeley 2012; Creswell and Creswell 2018) about student agency as reported by the participants. We then meticulously summarized and synthesized the explicit and implicit meanings that were extracted from the findings and wove them into the discussion, supported by the strategic integration of multiple perspectives from a variety of credible sources. Again, to ensure reliability and authenticity, and to avoid bias and prejudice, the voices of all the

participants are directly or indirectly woven into the discussion for as Bazeley (2012) and Wisdom and Creswell (2018) reminded us, reliability and authenticity add to the credibility and trustworthiness of mixed methods research. More specifically, Storm (2005) suggested that credible and trustworthy student perspectives on the application of agency in tertiary-level writing instruction is vital to how administrators and instructors understand how this transforming pedagogical approach works for higher education learners. Hence, it was a necessity to integrate convergent and divergent findings in the discussion to create a balanced and holistic (Reeves et al. 2018) representation of the participants' lived experiences with student agency in their critical reading and writing course.

Limitations of the study

The findings presented and discussed in the study are limited to the experiences of the 37 Science students who participated in the study. They do not represent the experiences of the entire cohort that pursued the critical reading and writing course in the second semester of 2018–2019. Thus, the participants' perspectives on student agency are not generalizable. However, writing administrators and facilitators at the research site and beyond can ponder the findings when they plan and deliver writing courses aimed at getting students to become agents of their learning. We did not have control over the number of participating students. We worked with the ones who agreed to participate in the research and signed and returned the consent forms.

Given the institutional policies and structures, all students doing majors in Science and Technology and Medical Sciences, like their counterparts in other faculties, are mandated to take a semester-long critical reading and writing course. Therefore, we had to work with that non-manipulable constraints including time, gender and age. Furthermore, the participants completed the questionnaires independently in their self-selected times and spaces. We were not in the position to ensure that they responded to each item or to identify response bias (Mazor et al. 2002). Also, we are not experienced 'fully integrated mixed designs' research methodologists. However, our research was guided by exemplary works done by experienced researchers including Creamer (2018), Creswell et al. (2003) and Schoonenboom and Burke Johnson (2017). In spite of the limitations, the study's purpose of garnering reliable and authentic students' perspectives on student agency in a foundation writing course at tertiary-level instruction was achieved.

AQ2

Ethical Considerations

Prior to the start of the research process, we informed our Head of Department of our intention to do a study on student agency and solicited her support. Consent forms were distributed to the students during the week of 21 January 2019. The completed forms were returned to the researchers in short order. We adhered to matters concerning anonymity, privacy, confidentiality and informed consent as required for reputable educational research (Abed 2014; Erol 2017; Head 2020). In terms of anonymity, the participants were informed that their names would not be used to identify the perspectives they would share and that the results of the research would be solely used for educational purposes. They were assured that by participating in the study, they would not be exposed to any harm or danger and that they were free to withdraw their participation at any time if they so desired.

Findings and discussion

An advantage of conducting mixed methods research is that investigators 'give a voice to study participants and ensure that study findings are grounded in participants' experiences' (Wisdom and Creswell 2013). The voices of the participants are given special privilege in this section of the study. The findings are organized under four broad themes: 'Students' Critical Reading and Writing Concerns; 'Student Agents' Plans of Action; 'Self-monitoring of Progress and Student Agency' and 'Student Agency: Participants' Advice for Prospective Students.

Students' critical reading and writing concerns

The first research questions asked: What are the concerns that the participants have prior to their engagement in the critical reading and writing course? Information gathered from their initial reflections and written responses to Item 9 on the first questionnaire provided relevant perspectives. All of the participants did the reflection and 30 (81.1%) responded to that question and seven (18.9%) left the space provided blank. While doing repeated triangulation of the data (Creswell and Creswell, 2018), concerns identified in the participants' initial reflections and responses to Item 9 were weaknesses linked to conventions of grammar, problems with synthesizing, summarizing and paraphrasing, inadequate critical thinking skills, confusion with documentation and fear of writing and failing.

The foregoing list of critical literacies concerns revealed by the students was not exhaustive. The 18.9% of the participants who did not identify their weaknesses raised concerns for us. As the course unfolded, during lectures and seminars and when the participants consulted with us, we also observed and recorded in our observational and anecdotal notes, other challenges that in general and particular instances, participants had with their critical literacies. Some of these were fear of public speaking, lingering damage caused by prior unfavourable classroom experiences such as former teachers' use of red ink to deface students' written assignments and pungent teacher/peer criticisms.

Also, in assessing the students' coursework collectively at standardization meetings and when we marked independently, we found weaknesses in the students' individual and collaborative oral and written assignments. Examples of these were lack of depth in the reflections, shallow SRP proposals, weak analysis in the syntheses and superficial peer reviews. For Item 15 on the second questionnaire that asked which activity the participants found most rewarding, 11 (27.7%) selected the peer review. This is an activity for which they need more practice because students tend to be afraid to take the risk to comment on their peers' writing. Based on their comments, they think that they lack the expertise to engage in this task. This is a concern that needs discussion for future delivery of the course.

Further probing of the 18.9 % of the participants who did not identify their weaknesses in critical literacies, we wondered whether they were not aware of their learning concerns, or if they did not accept their shortcomings. Either way, the 'blank spaces' were troubling. Based on past experiences, they probably represented untold/hidden learning realities or stories such as affective and intellectual domain issues (Jones 2019). These could include lack of confidence and or deficiency in metacognitive skills, among others.

Metacognitive skills are essential to the roles that students play in owning and assessing their weaknesses and their attempts at finding solutions to their problems (Flavell 1976, 1979). Without proficient metacognitive skills, the application of principles of student agency in writing instruction might not be maximized when tertiary-level learners are required to engage individually and collectively in the different stages of the writing process: prewriting, drafting, revising, editing and proofreading (Jones and Milson-Whyte 2000). They might find it challenging to benefit from the inextricable reading+writing+listening+ speaking+ thinking+ viewing connection. Teams that benefitted the most from consultations

during the writing of the Scientific Research Paper (SRP), did their self-reviews and formulated useful questions prior to arriving for their sessions. This pre-engagement helped them to use their consultation time efficiently as well as to get informed tutor guidance to complete the revision of their collaborative papers.

Addressing students' critical reading and writing concerns

Whether stated or implied, tertiary-level students who have critical literacy concerns need timely intervention if they are to become effective agents in their writing education. Struggling with the development of the section of the collaborative SRP, that was assigned to her, one participant revealed at consultation on 18 March 2019 (Week 9), that she did not believe she would ever recover from the day when she eagerly awaited feedback on a composition she had written for a former teacher. She said that the teacher told her in the earshot of her classmates, 'Don't expect much!' She explained that those insensitive words cast her in a pool of doubt concerning her ability to write. She disclosed that it bothered her that in addition to passing the curt remark, her teacher wrote numerous lines of indecipherable comments on the pages on which she had diligently written her composition: 'What?' '???' 'So!' 'Not clear!' 'What do you mean?'

According to this participant, the teacher did not offer suggestions on how she could improve her writing. Years later, this incident was still causing her to lack confidence in her ability to write as required at the tertiary level. She recalled that the teacher told her to read her comments and then identify and correct the errors in her composition. This is an apt example of the teacher being 'missing in action'. There was no teacher-student dialogue. In reflecting on this student's unfortunate learning experience, the thought that came to mind was that if writing instructors do not handle their students' writing efforts with care, they are likely to stifle their potential of becoming agents of their learning. This is the point that Siedlecki (2021) brought to the fore in his honest and thought-provoking perspectives on student ownership of their writing.

The participant's primary school teacher expected the student to read the comments, and work on her weaknesses independently, but the outcome was damaging. Vaughn (2018) suggested that, '... even if educators agree in principle that students should become agentic and independent, they may struggle to translate that goal to classroom practice...' (63). Exemplary student agency is an art that requires gradually developed,

heart-to-heart student-teacher collaboration. In the second portion of the menu of teacher practices on student agency provided by Zeiser, Scholz and Cirks (2018), they advised educators to develop relationships with their students, give them feedback, guide them in the setting and attainment of personal goals regarding their coursework, have individual student-teacher conferences and give them a say in matters concerning their learning.

The importance of these 'staples', especially healthy tutor-student relationships and sensitive oral and written feedback, in the 'academic literacies diets' of Science students, cannot be overemphasized. The last thing that tertiary-level writing facilitators should do is to practise 'the banking concept' (Freire 1993, 77) in their pedagogy. Freire explained this concept: 'The more students work at storing the deposits entrusted to them, the less they develop the critical consciousness which would result from their intervention in the world as transformers of that world' (77). From all indications, the experience the student had with her primary school teacher with her composition affected her willingness to engage in the writing process. This participant's emotional and intellectual repositories were stiflingly full. By releasing them in caring conversations at consultation sessions for the remaining weeks of the semester, she grew less tense and more amenable to agentic engagement and a great change could be seen in her learning of tertiary-level writing.

One participant's response to Item 9 on Questionnaire 1 was different from the others who answered it: What are some areas of concern that you have pertaining to your critical literacies? That student wrote, 'I have no concerns. I expect to engage critically and improve my academic literacies by the end of the course'. Although this student revealed that he had no critical reading and writing concerns, this budding scientist saw the need to seek advice from the writing instructor. Probably, this student was aware of the benefits to be derived from assuming ownership for his learning. Thus, he had a plan in mind, which was to learn as much as he could. Referring to the importance of academic literacies, Milson-Whyte (2015) suggested that for tertiary-level students, these benefits entail the ability to 'comprehend, evaluate, challenge and eventually produce such discourses in order to communicate effectively in writing in [tertiary-level institutions] and beyond' (7). The same participant who showed great interest in agentic engagement wrote the following in a post-research correspondence: 'I have been thinking about improving my conversational, interviewing and public speaking skills. I see this as an essential for my personal and professional development, especially for postgraduate

scholarship' (Email message to author, 17 June 2021). That is an apt example of student agent's plan in action.

Student agents' plan of action

The second research question was, 'What were specific plans of action that the participants implemented to address their academic literacies concerns during their pursuit of the course?' As a follow-up to Item 9 on Questionnaire 1, Item 10 asked the participants to state the plans of action that they would initiate to ensure that they assumed ownership for the learning while pursuing their critical reading and writing course. The responses provided by 81.1% of the participants reflected the recurring theme 'practice'. Reading, like writing and the other critical literacy skills require practice. The habit of repeatedly practising reading and writing for academic purposes is one way to constantly and actively engage in agentic learning. According to Bandura (1999), the rewards are manifold, including students' construction of knowledge and the development of their competencies such as engagement in self-monitoring their learning.

Self-Monitoring of progress and student agency

The third research question focused on students' self-monitoring of their progress: How did the participants self-monitor their progress while taking charge of their critical literacies learning? Three recurring strategies were identified when the data from Item 9, an open-ended question were sorted: Explain what you did to measure your own progress in order to accomplish your goals. Of the 37 participants, 28 (75.8%) clearly described specific strategies: 21(56.85%) used comparison, 4(10.8%) employed reflection and 3(8.1%) utilized evaluation. The responses generated by 8(21.6%) of the participants did not have any bearing on the question. One participant (2.7%) did not respond. It could be that the 9 participants (24.3%) whose responses did not match the question were not clear about how to measure their progress. Cresswell (2000) noted that even though self-monitoring is a useful measurement tool for self-regulation of learning, '... there are also potential problems in this technique... because students may not have developed the ability to articulate their concerns...' (para. 1).

Although the participants were required to write two reflections as parts of the course's assessment, one at the beginning of the course

and one at the end, and they were expected to compare them, it was not a popular self-monitoring tool for the participants. This was confirmed in the findings which emerged from Item 9: Which of the foundation critical reading and writing activity did you find most rewarding as you assumed your learning in the course? Six participants (16.2%) selected the initial reflection and 5 (13.5%) chose the final one. Having taught foundation writing courses at the research site over the years, we have found that some students do not do very well in the writing of their final reflections. Some of them use this important assignment as a means of 'lamenting and venting' about the course. Their level of analysis is very low because rather than reflecting, on their lived experiences in the course, and thoughtfully reviewing their strengths and weaknesses, they do a literal listing of the activities in which they engaged. Thus, the low ratings that the participants assigned to reflection as a means of self-monitoring the progress they made in the course are significant. Although each semester one lecture is dedicated to reflective writing, there is the need for the students to engage more extensively and meaningfully in reflective practice as a part of student agency.

Tertiary-level learners like their counterparts in different tiers of the education system can benefit optimally from student agency in the development of their critical literacies if in addition to getting constructive feedback from their facilitators, they learn to reflect on their learning as part of the self-monitoring their progress. Cresswell (2000) attested to the fact that, 'student self-monitoring is a valuable way of increasing the element of autonomy in the learning of writing' (para. 1). As a self-monitoring tool, reflective writing is a predictor of academic success because it helps students to identify and think about their strengths and weaknesses and to make informed decisions about their learning input and output (Tsingos-Lucas et al. 2017). Therefore, going forward, the use of reflective writing in the critical reading and writing course for Science students needs thoughtful revision.

Student agency: participants' advice or prospective students

The fourth research question invited the participants to advise future Science students concerning what they could do to ensure that they take charge of their learning when they pursue the critical reading and writing course. Compared to the 81.1% of the participants who wrote responses to Item 8 relating to their critical literacies concerns on Questionnaire 1,

100% provided answers. When closely examined, the participants' responses though different, had a striking similarity. They all advised future students that while pursuing the course they should develop ownership for their learning. Though dramatic, Participant 33 provided the essence of the participants' advice, 'Take charge of your learning and attack the course head on'. That is the epitome of student agency combined with principles of student ownership (Flavell 1971; Siedlecki 2021) and student engagement (Klemencic 2015).

Based on the participants' advice, for student agency to work optimally in the critical reading and writing course, action is required from multiple stakeholders. First, the administrators and instructors of the course should plan smartly and put measures in place to help their students to establish and maintain principles of agency in their critical literacies endeavours because although the course title includes 'critical reading and writing', while pursuing it, they had to simultaneously engage in critical thinking, interpretive reading, analytical viewing good writing informed speaking and active listening. The participants' responses to Item 13 on Questionnaire 2 showed the extent of their engagement: Put an X beside the critical literacy skill in which you engaged while you assumed ownership of your learning in the course. More than 50% of the participants revealed that they engaged in each literacy skill while they assumed their learning, with the highest numbers being 27(72.9%) for interpretative reading, and 28(75.7%) for critical thinking and good writing. The high percentage for reading is a good sign. It could have a strong bearing on the manner in which the course was designed. From the beginning to the end, the students had to assume the responsibility to read critically. Two excerpts from the final reflections attest to this:

Excerpt 1: I learnt how to read texts with a critical eye while designing the SRP. I learnt that it is best to read before writing and that if I read with a more critical eye, I will write better. Before and while designing the SRP I engaged in critical reading of journal articles. Reading journal articles with a critical eye enabled me to develop new knowledge and insights for a successfully designed SRP.

Excerpt 2: In preparation for the construction of the SRP, I read numerous credible articles to gather information about the use of neurological prosthetic devices to aid in the rehabilitation of disabled individuals. Understanding the purpose of each article was crucial in the decisions I had to make concerning the integrity and soundness of the evidence that I recommended for my team to cite in the paper. While I read purposefully, I discovered the limitations of neuro-prosthetic devices and I was proud of this accomplishment in my critical reading which sharpened my ability to select apt examples. I was amazed at how the research process in which I engaged was made easier because of my choice to read with a purpose.

These perspectives exemplify the participants' appreciation of reading as an invaluable skill and its importance to good academic writing.

However, active listening got the lowest score 24(64%). Based on past experiences, listening is not always treated as an important learning tool in learning environments. This is ironic because active listening is vital to any pursuit in higher education. The negative effects of poor listening in such an environment played out in the kinds of questions that the participants asked during or after seminars when information was shared with them. For example, even though the consultation hours for the researchers were announced at the first lecture, soon after they asked: 'What are the course coordinator's consultation hours?' It seems out of place to remind tertiary students to listen more attentively. If and when poor listening takes place, their facilitators need to point out that weakness to them. In doing this, the facilitators should also make themselves available to offer support to students because although it is desirable that students own their learning, they cannot do this independently. The facilitators should practise cultural sensitivity and cultural humility (Sheets 2005; Diller and Moule 2005). These require of them to get to know their students' interests, idiosyncrasies, capabilities, preferences, cultural practices, language, developmental stages, strengths and weaknesses, among others. In this way, they can play pivotal roles in their students' transformation, because in the final analysis, the thrust of the critical reading and writing course is to equip students to become lifelong agents of change. The National Research Council (2012) stated that these skills are fundamental to university students' attainment of positive outcomes.

Second, the development of student agency for their critical reading and writing learning requires intentional action from students. Empowered by instructors, these students are poised with self-efficacy. 'Self-efficacy relates to ...individual[s'] perception of their capabilities. It has a clear self-evaluative dimension leading to high or low perceived self-efficacy' (Cassidy 2015, 1). Students who have developed self-efficacy benefit from facilitators who resist the temptation of pouring out their knowledge on them (Freire 1993 Vaughn 2014). Rather, they embrace a philosophy of teaching that behooves them to give their students wings so that they can soar to new heights of infinite possibilities.

The foundation writing course that was investigated was designed to give the Science students agentic experiences in interconnected critical thinking, interpretive reading, analytical viewing, good writing, informed speaking and active listening. For Item 15 on Questionnaire 2, they were

asked to select activities they found most rewarding while they assumed ownership of their learning. The results are presented in Table 2:

Table 2: Participants' most rewarding learning activities.

Activity	Number of students	Percentage
Writing initial reflection	6	16.2
Reading stimulus passages	13	35.1
Evaluating sources	10	27.0
Annotating source	13	35.1
Writing the synthesis	11	29.7
Writing the collaborative SRP	34	91.8
Writing the self-review of the SRP	11	29.7
Creating and presenting the poster	35	94.6
Writing the final reflection	3	8.1

The 91.8% and 94.6%, respectively, indicate that the participants found the writing of the collaborative SRP and the poster presentation most rewarding. We observed them actively engaging when they put Tuckman's revised hypothesis about the small group stages of small-group development to the test: 'forming', 'storming', 'norming', 'performing, and 'adjourning' (Tuckman and Jensen 2010). These stages were introduced to them in the initial lecture for the course 'Introduction to the Academic: Academic Engagement and Working in Teams'. While the participants engaged in these stages, they developed the art of negotiating, compromising for the greater good, empathizing, appreciating differences, using and celebrating individual and collective talents, among others. Those soft skills are assets to student agency. However, when attending consultation sessions during the research process, there was always at least one participant who remarked, 'Miss, group work is a lot of work!' Though the writing of the SRP and the creation and presentation of the poster are intellectually, physically and emotionally demanding, in the end, most of the participants valued learning experiences they provided. Excerpts from two of their final reflections confirm this assertion:

Excerpt 1: While writing the SRP I learned to do inter-textual analysis using different sources as well as improved my writing for a diversified audience. In the collaborative writing of the SRP we were required to read critically from multiple sources and this required inter-textual analysis to support our claims. It is easy to quote sources and write about them without doing any analysis. This is something that I had struggled with for a long time as I had a misconception of what analysis really required.

I learned to read, analyse and synthesize the information gleaned from the reliable sources and to interpret it in my own words to support my claims...Inter-textual analysis will be useful in the MBBS degree...

Excerpt: 2. Doing the SRP has been a roller coaster ride. It had its challenges from which I have grown. My tutor has been nothing short of patient and understanding, guiding me to not only do my best but to be my best. I was initially apprehensive to the work set out before me and in a group much less. However, as time went by, I became grateful for the power of teamwork. I also appreciated the patience and the time it must take a writer to review and proofread his/her work in order to produce a final masterpiece.

The 8.1% for the final reflection is telling. Although all of the students completed the task, it was clear that some found it challenging, and they might have lacked the confidence to evaluate their learning experiences, among others. Therefore, there is the need for use of this important evaluative tool in the course to be revisited so that future students may find it as rewarding as the participants found the collaborative SRP and poster creation and presentation.

Finally, at the beginning of the research, we wondered whether the tertiary-level Science students would attain positive outcomes if they assumed agentic roles in their pursuit of the foundation critical reading and writing course. The ultimate positive outcome is presented in Figure 2:

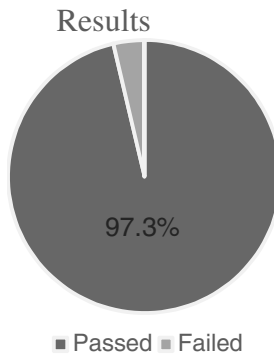


Figure 2. Participants' results for critical reading and writing course

The results show that 36(97.3%) passed and 1(2.7%) failed. Their grades ranged from 82% (A) to 46% (F). The participant who failed did not sufficiently engage in the course. He made the following remark at one seminar for which he had not prepared: 'I do not know why I have to do this course. It is a complete waste of my precious time. I do not need it to do my graphic arts business' (Researcher's anecdotal note, March

14, 2019). The final reflection that he submitted to Turnitin computed a similarity index of 76%. It matched the submission made by his friend in a previous offering of the course. It is noteworthy that the overall pass rate for the course that semester when the research was conducted was 95.5%. This is an indication that the research participants, as well as the non-participating students, benefited from the agency-driven delivery of their tertiary-level foundation critical reading and writing course.

Implications

The perspectives shared by the participants suggest that the use of agentic approaches in tertiary-level academic writing instruction can yield positive outcomes. Critical reading and writing course administrators and tutors as well as the students should be aware of and pay keen attention to the relationship that exists among student agency, metacognition, self-monitoring, self-regulated learning, student ownership, student-centred learning and student engagement. These should be taken into consideration when planning and implementing agentic delivery of the course. Writing facilitators should spend appreciable time and effort to plan ahead so that students can have ease of access to main course materials as well as other relevant and developmentally appropriate supplemental resources that can help their students to engage in agentic learning.

Effective student agency in the tertiary-level critical reading and writing instruction requires student-initiated engagement, student-student engagement and student-tutor engagement. There is the need for writing tutors to educate Science students about the self-monitoring of their learning progress. This will help the students to troubleshoot the problems they encounter and to arrive at practical solutions. If their attempts at solving their problems are not successful, they should engage with team members or other peers. They should consult with their writing instructors if their problems are unresolved. Such engagements exemplify the application of principles of student agency. We believe the following recommendations suggested by Zeiser, Scholz, and Cirks (2018) are worth emulating:

Assessment. Teachers design formative and summative assessments to evaluate student agency and/or to provide students with extrinsic motivation to build agency.

Direct Instruction. Teachers provide explicit instruction to develop skills related to student agency.

Modeling. Teachers model agency to demonstrate it to students in a meaningful context.

Positive Reinforcement. Teachers provide positive reinforcement for demonstration of agency.

Scaffolding. Teachers provide students with tools, strategies and resources to help scaffold students towards mastery of agency.

Verbal Cues. Teachers provide brief spoken prompts in real time to highlight or remind students of behaviours that demonstrate agency. (9)

To attain the best outcomes, students should be willing to take the risk to establish and maintain healthy agentic partnerships with their peers and instructors because collaboration can create wonders in the tertiary-level writing classroom, be it virtual or physical.

Conclusion

The use of agentic approach to the teaching of writing courses to the Science students was a rewarding way of getting the participants to actively engage in their learning. This approach gave them manifold opportunities to draw upon their self-efficacy, as they made informed choices concerning their learning in the course. The participants realized that there were benefits to be derived from the choices that they made to purposefully apply principles of metacognitive theory, self-monitoring, student-regulated learning, student-ownership, student-centred learning and student engagement. Among these benefits were learning the art of assuming ethical responsibility and developing an awareness that student agency is the key that opens doors to new discoveries about themselves as learners, especially their ability to do what scientists are 'called' to do, generate and record evidence-based information. Finally, to situate this study in a fitting historical frame, we borrowed from the profound words of the creator of the quantum theory, Max Planck, 1918 recipient of the Nobel Prize in Physics:

Anybody who has been seriously engaged in scientific work of any kind realizes that over the entrance to the gates of the temple of science are written the words: Ye must have faith. It is a quality which the scientists cannot dispense with (quoted in Bishop et al. 2018, 54)

Indeed, the power of the written word should not be underestimated in the development of scientific minds. Having entered their critical reading and writing course, the students soon discovered that their fate was in their hands and that if they fully engaged and exercised faith in themselves, their peers, writing instructors as well as others in their support system, they could become agents of their learning, capable of making 'quantum leaps'. The positive outcomes of their agentic engagement in the foundation writing course will no doubt enhance their academic

and professional pursuits and make them stand tall and resolute, like ancient Egyptian pyramids.

**After
Applying
Principles of
Metacognition
And self-monitoring
Student-regulated learning
Activating student ownership
Trying student-centred learning
Daring to embrace student engagement
Questing student–teacher collaboration
Finding student–student-derived solutions
Analyzing deeply for student self-reflection
On how student agency yielded positive outcomes
We discovered that strategic use of agentic teaching and learning
Sets the foundation for personal, academic and professional development**

Future research

Given the importance of student agency to yield positive learning outcomes in tertiary-level critical reading and writing, and the paradigm shift that is currently taking place in education, it would be useful to investigate the roles that agentic approaches play in engaging students in online writing courses. A longitudinal study on this important topic, with an entire cohort of Science students, could be beneficial to further development and delivery of the critical reading and writing course at research site. Because of its multi-dimensionality, a hybrid design (Schoonenboom and Johnson 2017) would be invaluable because the integration of principles of qualitative and quantitative research designs has the potential of yielding more complex, comprehensive and reliable findings that can enlighten the course facilitators, future students and the wider tertiary-level education community.

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Appendix: Questionnaires

Questionnaires 1

Questionnaire for 'Agency: Students Assuming Ownership of their Learning in a Foundation Writing Course Designed for Science and Technology and Medical Sciences Majors'

Information obtained from this questionnaire will be used in published and unpublished reports on 'Agency: Students Assuming Ownership of their Learning (critical thinking, interpretative reading, good writing, analytical viewing, active listening, informed speaking) in a Foundation Writing Course Designed for Science and Technology and Medical Sciences Majors'. By completing this questionnaire, you are agreeing that data gathered from this research project may be used for educational purposes.

Instructions: Please type an X to the right side of the responses which apply to you and write full sentences where necessary.

1. What is your gender? **a.** Female **b.** Male
2. What is your country of origin? _____
3. What is your age range?
a. 17-20 years **b.** 21-25 years **c.** 26-30 years. **d.** 31 years and above
4. In which faculty are you pursuing your undergraduate degree?

5. Which year of university studies are you? **a.** First Year? **b.** Second Year? **c.** Final Year?
6. What is your major/programme? _____
7. What are your expectations of the course?

8. What are some strong areas of your critical literacies and how do you believe you will engage them for the best result in the course?

9. What are some areas of concern that you have pertaining to your critical literacies?

10. How do you plan to address these issues while you pursue the course?

Questionnaire 2

Questionnaire for "Agency: Students Assuming Ownership of their Learning in a Foundation Writing Course Designed for Science and Technology and Medical Sciences Majors"

Information obtained from this questionnaire will be used in published and unpublished reports on 'Agency: Students Assuming Ownership of their Learning (critical thinking, interpretative reading, good writing, analytical viewing, active listening, informed speaking) in a Foundation Writing Course Designed for Science and Technology and Medical Sciences Majors'. By completing this questionnaire, you are agreeing that data gathered from this research project may be used for educational purposes.

Instructions: Please type an X to the right side of the responses which apply to you and write full sentences where necessary.

1. What is your gender? **a.** Female **b.** Male
2. What is your country of origin? _____
3. What is your age range?
a. 17-20 years **b.** 21-25 years **c.** 26-30 years. **d.** 31 years and above
4. In which faculty are you pursuing your undergraduate degree?

5. Which year of university studies are you? **a.** First Year? **b.** Second Year? **c.** Final Year?
6. What is your major/programme? _____
7. In what ways has the course lived up to your expectations?

8. What were the goals that you set for your critical literacies learning at the beginning of the course?

9. Explain what you did to measure your progress in order to accomplish your goals.

10. What were some choices that you made while you assumed responsibility for your learning in the course?

11. What were some of the challenges you encountered as you took charge of your learning?
12. What were some specific actions that you took to help you to cope with and overcome the challenges?
13. Put an X beside the critical literacy skill in which you engaged while you assumed ownership of your learning in the course?
a. critical thinking **b.** interpretive reading **c.** analytical viewing
d. good writing **e.** informed speaking **f.** active listening
14. How did the skill(s) enable your learning in the course?
15. Which of the following activity/activities did you find most rewarding as you assumed ownership of your learning while pursuing your foundation writing course?
a. writing of the first reflection **b.** reading the stimulus passages
c. evaluating sources **d.** annotating the source
e. writing the synthesis **f.** writing the collaborative SRP
g. writing the self-review of the SRP
h. creating and presenting the poster
i. writing the final reflection
j. Others _____
16. What could you have done differently to get the best results from assuming responsibility for your learning in the course?

17. What aspect of your work do you think was most effective as a result of you taking charge of your learning? Why?

18. What aspect of your work do you think was least effective as a result of you taking charge of your learning?

19. What did you discover about yourself as a learner as you assumed responsibility for your learning?

20. What advice would you offer to future students to help them to gain optimally from taking charge of their learning in the course?

QUERIES

AQ1: Please check if the edit made in the sentence "The combination of..." conveys the correct meaning.

AQ2: The reference Creamer (2018) is cited in the text, but not provided in the reference list. Please provide.

Two Different Stories: A Mixed Methods Investigation of Crime in Antigua and Barbuda

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Abstract

This study makes an argument for a constructionist understanding of crime in Antigua and Barbuda. Specifically, the study argues that the way in which members of the public and the news media talk about crime is important because understanding how crime is framed in terms of causes and remedies necessarily influences who we criminalize, what legislation we pass and how we allocate our tax dollars. As such, framing crime in ways that are tinged with hyperbole, or that run contrary to evidence is unlikely to result in effective policy responses. However, this study is not rooted solely in social constructionism. The study also proceeds on the basis that there is a world of material reality that exists independently of our perceptions of it. Exploring the dissonance between the ways in which crime is experienced and the way in which it is reflected in official crime data relies in part on this premise. In seeking to understand how crime is constructed in the media and public discourse, the study identifies biases and alternative interpretations through a comparison to official crime data. To this end, the study adopts a concurrent embedded mixed methods research design that includes the collection and analysis of quantitative data as well. To create an empirical account of historical crime trends and patterns in Antigua and Barbuda, which does not currently exist beyond this study, there is analysis of 40 years of official crime data to determine the overall scale of crime, the relative incidence of different types of offences, trends in those offences over time and their geographical distribution.

Keywords: Antigua and Barbuda; crime; frame theory; pragmatism; concurrent embedded mixed methods research design.

¹For the most part we do not first see, and then define, we define first and then see. In the great blooming, buzzing confusion of the outer world we pick out what our

culture has already defined for us, and we tend to perceive that which we have picked out in the form stereotyped for us by our culture'.

- Walter Lippman (1922, 81)

Introduction

If you spend enough time in Antigua and Barbuda, you are likely to encounter talk about crime. And, when you do, you will probably hear claims that crime has increased significantly over the past 30 years and continues to do so largely unabated. You may hear a throne speech in which the Governor-General confirms and denounces the increase in crime and outlines what her or his government plans to do about it (see, for example, Antigua and Barbuda Speech from the Throne 2015). You may hear a politician declaring a 'war on crime' (see, for example, Antigua and Barbuda Labour Party Manifesto 2018) or you may hear people lamenting the way in which criminals have become so bold - daring to commit armed robbery in 'broad daylight'. You may hear regret that the 'serial rapist' was never caught (see, for example, Baksh et al. 2017) and now amidst the COVID-19 global pandemic you may hear that the people getting arrested for breaking curfew and flouting other COVID-19 protocols deserve whatever they get (see, for example, public comments on *The Daily Observer* 1/28/2021). In all of this crime talk, you may hear people calling for stiffer penalties including the death penalty or you may hear people lament, simply, that as a result of 'increased' crime, life in Antigua and Barbuda is not like 'before time'¹ (see, for example, the sentiments in the editorial of *The Daily Observer* 12/9/2017).

Indeed, a victimization survey conducted by the United Nations Development Programme ('UNDP') found that more than half of all respondents living in Antigua and Barbuda felt insecure because of crime or uncertain because of crime and security. According to the survey, nearly a quarter of respondents frequently worried that their house would be broken into at night or that they would be robbed at gunpoint. Additionally, almost 20 per cent of both men and women frequently worried about being sexually assaulted. Consequently, in an attempt to feel more secure, just over a quarter of respondents said that they kept a weapon at home (UNDP 2012).

If you read *The Daily Observer*, Antigua and Barbuda's most widely circulated newspaper, you would have reason to believe that all the crime talk you have heard is accurate. You may read headlines such as 'Tourist Held At Gunpoint On Runaway Beach', 'Seventy Year Old

¹ Antiguan and Barbudan parlance for 'generations ago'.

Woman Brutally Attacked in Her Home', or 'Courts Should Impose Appropriate Sanctions'. You may even come across a letter to the editor entitled 'Capital Punishment: A Biblical Perspective'. Or, you may encounter a headline that boldly declares, '2007 Crime Stats Confirm Public Opinion', with a corresponding story explaining to readers that

[c]rime statistics show that overall there were 310 more reported incidents of crime in 2007 than 2006. This confirms the publicly held sentiment that crime is on the increase. Police figures show that there were 3,869 incidents of crimes on the blotter in 2007, compared to 3,559 in 2006 – an 8.71 per cent increase (*The Daily Observer* 2/8/2008, 20).

From the newspaper accounts of crime, you may get the general feeling that most crime in Antigua and Barbuda is violent, both violent crime and property crime are on the rise, and that very young people, the elderly and women are the most frequent victims of this crime.

But, when you look at official crime data from 1970 to 2020, you will realise that much of what you have heard and read is not borne out by the data. For example, notwithstanding spikes in the recorded crime figures, the rate of violent crime has remained relatively stable since 1970 trending downward from 1995 to an all-time low in 2020. Similarly, the rate of property crime decreased sharply from its peak in 1995 and has remained stable from 2008 to 2020. If you look at the UNDP survey, you will find that despite the feelings of insecurity and media reports suggesting otherwise, only 11 per cent of residents admitted to being victimized in the year preceding the survey. This self-reported victimization rate compares favourably to the rates among 30 nations that participated in the International Crime Victimization Survey (the 'ICVS'). The ICVS found that 16 per cent of respondents reported that they had been victims of crime during the previous year (UNDP 2012).

This is not to suggest that crime is not a problem in Antigua and Barbuda, it may well be. However, there is a clear disconnect between the crime narrative told by official crime data and that told by members of the public and the news media. There is a clear disconnect between the 'objective' indicators of crime and the way in which crime is experienced and treated. This study is about the disconnect – why it exists and its implications for criminal justice policy. Thus, this study proceeds largely on the constructionist assumption that, 'the world may be in one state, but people can believe it is in another state and act accordingly' (Surette 2015, 31). Put differently, the purpose of this study is to understand how public crime perceptions come to be, how they compare with official crime data and to identify which crime frames most resonate with the populace.

With this knowledge, advocates and lawmakers can design evidence-based policy proposals that are not only politically palatable but also criminologically sound.

Yet, in creating the research design, significant data gaps persisted. A developing country with limited resources, in many areas Antigua's records were sparse, manually kept or non-existent. As it became apparent that basic knowledge of the country's crime trends and patterns over time could shed additional light on, or help to contextualize, the various perceptions of the Antiguan crime problem, it also became clear that overcoming the data gaps that would impede such analysis could have important implications for Caribbean criminal justice policy. Because the Royal Police Force of Antigua and Barbuda ('RPF') did not keep computerized records prior to 1994, there is very little academic analysis of the country's crime trends during that time. Where such analysis does exist, gaps in the data are common and Antigua and Barbuda is discussed within the broader context of the English-speaking Caribbean (see, for example, de Albuquerque and McElroy 1999; Deosaran 2004). As a result, in order to assess subjective perceptions of crime² against the backdrop of police recorded crime trends, the collection and analysis of official crime data would need to be included in the design of the study. And, arguably, altering the research design in this way would necessarily shift the underlying epistemology of the study. This epistemological shift is significant because epistemology, or how we gain knowledge of what we know, necessarily influences how research questions are asked and answered. Additionally, epistemology is linked inextricably to the relationship between the researcher and research as well as the paradigm, or framework of beliefs and practices guiding the study (Creswell and Plano Clark 2011; Morgan 2007). Altering the epistemology would mean that the contemplated paradigm could no longer be solely constructionist, focused on process and meaning. The assumptions underlying this study would need to acknowledge, as Kirk and Miller (1986, 11) have acknowledged, that while reality may very well be socially constructed and composed of multiple truths, it could also be objective and exist independent of human perceptions.

Accordingly, this work is grounded in a mixed methods design, where both quantitative and qualitative data are collected, analysed and 'mixed' in a single study or series of studies (Creswell and Plano Clark 2011). At

²For the purposes of this study, 'crime' includes such violent crime as rape, indecent assault, shootings, homicide, wounding, assault and robbery and such property crime as breaking and entering, larceny in all its forms, burglary, false pretences, arson, malicious damage, embezzlement, fraud and fraudulent conversion.

the heart of the research design would be Creswell and Plano Clark's (2011) central premise that the combination of quantitative and qualitative data collection can provide a better understanding of the research problem than each approach on its own. And, the new mixed methods research design would be steeped in a paradigm of pragmatism – a paradigm that allows for diverse approaches and values both objective and subjective knowledge (see Creswell and Plano Clark 2011, 43). Underpinning this approach is Greene's (2007: 20) understanding that there are multiple ways of seeing and hearing, multiple ways of making sense of the social world and multiple standpoints on what is important and to be valued. Thus, my work assumes that Antigua and Barbuda's crime situation is extraordinarily complex, that there are multiple legitimate approaches to investigating it and that any given approach would inevitably be partial (Greene 2007). While I approach this research from a perspective of pragmatism, I cannot deny that my main emphasis is the social construction of crime and in fact, I apply to Antigua and Barbuda Surette's (2015) multi-pronged model of social construction. Like other researchers sympathetic to social constructionism, I openly acknowledge that the goal of my research is to rely as much as possible on the participants' views of the situation and to focus on the socio-historical context that shaped those views (see Creswell 2003). As such, the primary qualitative aspects of the research are based on contextual constructionist epistemological assumptions. In this study, I mix qualitative and quantitative methods in order to achieve completeness. In so doing, my intent is twofold: to create a more comprehensive understanding of the crime situation in Antigua and Barbuda given that such a comprehensive account has not been written to date and to demonstrate how researchers can use a mixed methods research design to overcome data challenges in social research in developing countries and environments where data may be sparse.

Methodology

Research Design

The study proceeds with a concurrent 'embedded', or 'nested', mixed methods research design symbolically represented as *QUAL (+quan)* (Creswell and Plano Clark 2017, 392; Creswell 2008, 214). In this design, the researcher implements a secondary quantitative strand within the larger qualitative case study. A strand refers to the component of the study that encompasses the basic process of conducting research – from posing the initial question to interpreting results generated from the data collected

to answer that question (Creswell and Plano Clark 2011). Unlike a sequential research design, in a concurrent design, the qualitative and quantitative strands are implemented at the same time and in a single phase. In this case, the supplementary quantitative strand is added to enhance the overall design (Creswell and Plano Clark 2011; Hanson et al. 2005).

In this research design, although both sets of data were collected and analysed concurrently and in a single phase, the qualitative data collection was an iterative process. As Figure 1 suggests, the qualitative data collection began with a review of speeches by partisan politicians, government speeches and publications, as well as a review of newspaper articles and my recorded observations. That information was then used to make minor revisions to the instrument that would serve as the basis of peer group discussions. The process of reviewing regularly the data generated and fine tuning the peer group discussion instrument was important in capturing all of the crime frames that were present in popular discourse. At the same time, official police data were collected. An Excel spreadsheet of all 'major crimes' or 'serious crimes' known or reported to the police in each year from 1970 to 2020 was created and served as the basis of a crime trend analysis.

The secondary quantitative strand was embedded within the larger qualitative case study because a single data set was not sufficient to

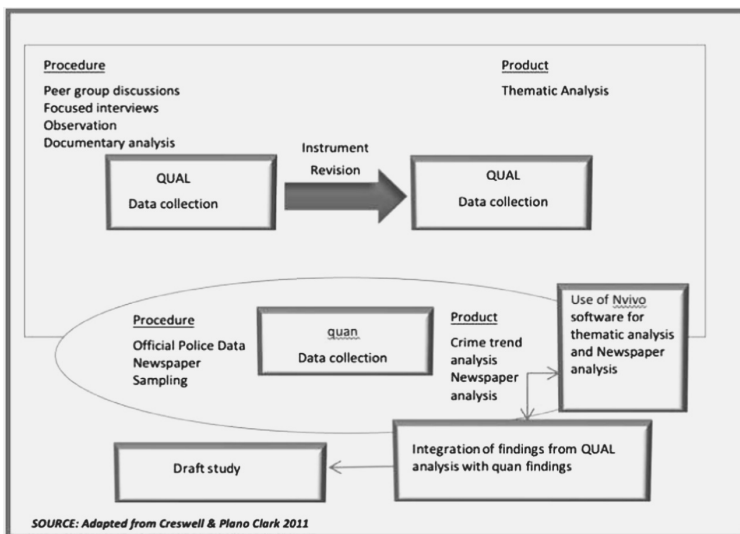


Figure 1: Concurrent Embedded Mixed Methods Design

answer both research questions. Official crime data and newspaper articles would not reveal much about popular conceptions of crime in Antigua and Barbuda just as individual accounts of crime could not provide an accurate account of crime trends and patterns. Moreover, the fundamental nature of each research question differed and each type of question required different types of data (Creswell and Plano Clark 2011). The goal with this research was to investigate 'multiple constructed realities' through the shared investigation of meanings and explanations. It was critical to know how people living in Antigua think and talk about crime – how their ideas are shaped, generated or moderated through conversation with others (Ritchie and Lewis 2003). It was critical to understand how the newspapers cover crime in the media. But it was also critical to have a sense of police recorded statistics over a long period of time – without the missing years that are all too common. Did referenced 'crime waves' correspond with actual increases in reported crime? Was there really significantly less reported crime during the 1970s and early 1980s? This mixed methods research design facilitates an understanding of crime in Antigua from the most empirical perspective available. Accordingly, the research is designed to answer the primary and secondary research questions:

Quantitative Research

The general approach to the quantitative research in this study was informed by objectivism. As an ontological position, objectivism builds on the positivist idea that social phenomena and their meanings have an existence that is independent of social actors (Bryman 2012). Notwithstanding the critiques of police recorded crime figures, these data were intended to provide some empirical basis for assessing claims made about crime. Although it is an imperfect measure, the official crime data shaped much of the interpretation of the qualitative data. As such, this quantitative portion of the research is concerned with the nature of the crime problem in Antigua – an unbiased description of crime patterns, crime trends and media representations. The researcher's relationship with this portion of the research was necessarily one of some distance.

In analysing the quantitative data, a basic crime trend analysis was conducted (Osborne and Wernicke 2003) using police recorded crime figures for the 50-year period between 1970 and 2020. The goal at this point was to create an empirical account of historical crime trends and patterns, which had not previously existed. This trend analysis attempted to

establish what Maguire (2007, 255) calls the 'basic contours' of crime in Antigua – the overall scale of crime and the relative incidence of different types of offences, trends in those offences over time and their geographical distribution.

According to Deosaran (2004, 114), the existing databases and methods of collecting crime data in anglophone Caribbean countries are deficient and even archaic. Consistent with this observation, Antigua and Barbuda does not have a database designed to capture incidents of crime reported to and recorded by the police. As a result, there was no easy way to extract or manipulate the records. Additionally, prior to 1994, police records were not computerized. At the national archives old colonial police records were reviewed, namely the annual reports entitled *Annual Report on the Organization and Administration of the Royal Police Force and Fire Service of Antigua and Barbuda*, which were discontinued in 1989. Senior police officers who were familiar with these reports verified their authenticity. These senior members also verified that the way in which the statistics were calculated for these reports is consistent with the way in which they are now captured notwithstanding the fact that the reports are no longer published. To obtain crime statistics for the years 1990 to 1993, the same senior members of the police force provided the old notebooks in which crimes at that time had been recorded and the statistics were recreated for those years. Finally, the police officer attached to the Criminal Investigation Department who is responsible for entering the statistics into a computerized file that is stored electronically, provided the crime statistics from 1994 to 2020. Analysing these data revealed the percentage of total recorded crime that was composed of violent crime and property crime and facilitated a comparison of the amount of violent crime to the amount of property crime recorded each year. This analysis also revealed the most prevalent violent crimes and property crimes over time as well as their geographic distribution.

In addition to the trend analysis, a newspaper analysis using quantitative content analysis was conducted. The newspaper analysis focused on newspaper articles discussing crime from 1994 to 2009. The sample for this analysis was derived from newspaper articles and commentary published in Antigua's *Daily Observer* from 1994 to 2009. The *Daily Observer* was selected because it was the newspaper with the largest circulation during the period under review and because the second most widely circulated newspaper, the *Antigua Sun*, ceased circulation during that period. As such the *Daily Observer* was the country's sole daily newspaper in circulation. The particular 15-year period was selected for several reasons.

First, the official crime data suggested a noticeable change in recorded offending patterns during this time. Next, government speeches and other documents suggested that politicians and senior government officials began referencing the country's crime 'problem' in the mid 1990s. Lastly, the first edition of the *Daily Observer* was published on 27 January 1994. The month of February was selected since it was the month with the fewest number of missing issues and the only month that was represented each year. All articles and commentary that discussed crime and crime control in Antigua and Barbuda were selected. In total, there were 1092 items that fit this criterion spanning all sections of the newspaper.

It is important to note that the findings of the newspaper analysis should not be generalized to all forms of media in Antigua and Barbuda or to those newspapers that are no longer in circulation. Findings are representative only of the type of crime discourse published in the most widely circulated newspaper and the type of media discourse that loomed in the background as people went about their lives and formulated their opinions about crime and criminal justice.

Qualitative Research

Frame Analysis

The specific methodology employed during this constructionist stage of the study is frame analysis. Frame analysis, a methodology widely attributed to (Goffman 1974/1986), is premised on the idea that we are active assemblers of meaning and in constructing accounts of public issues we draw upon the resources at our disposal, including popular wisdom, our personal experiences, and bits of media discourse. In using these resources to create coherent and meaningful accounts of public issues, we select from a range of interpretive frameworks available in the culture in order to create meaning (Sasson 1995). These interpretive frameworks, or frames, are the 'schemata of interpretation' and typically include a diagnostic component that identifies a condition as intolerable and attributes blame or causality, and a prognostic component that prescribes a course of ameliorative action (Goffman 1974/1986, 21; Borah 2011; Sasson 1995). Additionally, frame analysis presupposes that meaning created through the use of frames occurs in various contexts including mass media and everyday conversation.

This part of the study aimed to determine what the prevalent crime frames were, which frames dominated the public, media and political discourses, and why some frames were more successful than others. Newspaper articles, political manifestos, government speeches, speeches

by opposing politicians and political parties, parliamentary debates, criminal law judicial opinions and annual crime reports were collected and analysed. Understanding as Atkinson and Coffey (2011), that documents are not firm evidence of what they report but construct particular kinds of representations, these documents were used to establish a catalogue of culturally available frames on crime in Antigua and Barbuda (Sasson 1995). I conducted nine focused interviews (Kvale 2009) with key stakeholders in order to get a better sense of existing criminal justice policy, the newspaper production process and to discuss their own perceptions of crime in Antigua. According to Kvale (2009), focused interviews are neither strictly structured with standard questions nor entirely nondirective. I chose to interview senior government officials – the Minister of National Security, the Police Commissioner, the Prison Superintendent, a criminologist and a senior officer in the Criminal Investigation Department of the RPF, the Director of the Office of National Drug and Control Policy, the Director of Youth Affairs and the Director of the Bureau of Gender Affairs – to get a better sense of existing criminal justice policy and to capture government reactions to the final catalogue of frames. I was interested to hear how these officials would describe the country's crime problem. I selected these government officials based on their position in the current government. From the Minister of National Security, the Police Commissioner and the Prison Superintendent I was particularly interested in whether they were operating according to an articulated criminal justice policy and how criminal justice policy was constructed. From the directors of Youth Affairs and the Bureau of Gender Affairs, I was particularly interested obtaining any additional information they could provide with respect to youth and gender violence. I was interested in verifying newspaper reports of 'youth gangs' and school violence and 'gang violence'. I chose to interview the publisher of the newspaper not only to hear his views on crime and get his reaction to my catalogue of frames but also to have a sense of how the newspaper is produced.

Finally, finding value in the '...explicit use of...group interaction to produce data and insights that would be less accessible without the interaction of the group' (Morgan 1988, 12), I conducted ten peer group discussions composed of 52 members of the public in the hopes of eliciting perceptions of crime and reaction to the pre-established crime frames. The group discussions held were not traditional focus groups but were more akin to Gamson's (1992) peer group conversations, which are smaller than traditional focus groups, held in the participants' own

environment, conducted with participants who are already familiar acquaintances and conducted with little interference or intervention by the facilitator. I recruited participants for the peer group discussions using such convenience sampling techniques as email and word of mouth. I initially began recruiting participants by contacting the head of a community program conducted through the Bureau of Gender Affairs and engaging members of the public who visited the National Archives. I employed these recruitment techniques because I was cognisant of the fact that I was not asking participants to merely complete a survey or to participate in a peer group discussion at a neutral location, but rather to allow me into their intimate social spaces, including their homes (Gamson 1992). Each peer group discussion took place in a venue of the group coordinator's choosing and lasted between forty and 90 minutes. Most discussions took place in either a participant's home or a more institutional space in which the participants were accustomed to meet and discuss personal matters. Other venues selected by group leaders included the beach and a popular restaurant. In keeping with ethical research standards (Kvale 2009), at the beginning of each discussion I informed participants of the purpose of the study and explained to them that as part of the study I would likely publish the transcripts of the discussion in whole or in part. I reminded the participants that their participation was completely voluntary and they could withdraw their participation at any time without penalty. I assured the participants that their identities would remain confidential and that I would use pseudonyms in order to preserve their anonymity but that time constraints may force me to use a transcription service to assist me with transcription so there may be at least one other person who has access to the raw data. Lastly, I asked the participants for their permission to record the discussion with a digital recording device. In order to analyse the data, I personally transcribed each peer group discussion, which resulted in 88,000 words of data. While the peer group discussions cannot be generalized to, or held to be equally true of, all residents in Antigua and Barbuda, because the discussions created by the group were created collectively, it reflects the common sense of the culture from which the participants are drawn (Sasson 1995). Thus, what my peer group discussions provide is an intersubjective understanding – an understanding of the taken-for-granted assumptions shared by the group (Gamson 1992; Sasson 1995). As such, the potential danger of marginal ideas and individuals with idiosyncratic views were minimized in this research in ways that they may not have been in more conventional interview research (Sasson 1995).

The documentary analysis, focused interviews and peer group discussions were all intended to provide an in-depth understanding of crime in Antigua and Barbuda through the eyes of the public, the news media and political actors. Although discreet portions of the data analysis took place during the data collection process, the bulk of the analysis occurred after the data collection was already completed.

Qualitative Data Analysis

Qualitative data analysis involves coding the data, dividing the text into small units, assigning a label to each unit and then grouping the codes into themes (Creswell and Plano Clark 2011). The qualitative corpus of this study – all of the collected qualitative data – was analysed with two goals in mind: to track the frequency of crime frames selected from the extant literature and to capture frames that spontaneously emerged in the documents examined as well as the interviews and peer group discussions conducted. This method facilitated both deductive and inductive analysis of the data in two separate stages.

The corpus was read and reread in order to gain intimate familiarity with its contents. As Saldaña (2011) explains, by reading and rereading the corpus, you gain intimate familiarity with its contents and begin to notice significant details as well as developing new insights about their meanings. Patterns, categories and interrelationships become more evident the more you know the subtleties of the database. The initial data analysis was conducted using a deductive approach. With respect to the documents and focused interviews, the text was coded as displaying a positive version of a particular frame if it expressed at least one component of that frame to characterize Antigua and Barbuda's crime situation or as a solution to the country's perceived crime problem (Sasson 1995). Because each discussion rather than individual is the unit of analysis, in analysing transcripts of peer group discussions, where participants expressed unanimous support for a frame, that frame's performance was coded as 'strong'. Where participants disagreed with one another over a frame's merits, that frame's performance was coded as 'mixed' and where participants were unanimous in their rejection of a frame, that performance was coded as 'weak'.

Data analysis during the second phase of this research was more inductive. Here additional crime frames emerged organically. While descriptive codes were used (Miles and Huberman 1994) in order to help categorize and index the data corpus' basic contents (Saldaña 2011), values coding (Saldaña 2013) was also employed to identify the participants'

values, attitudes and beliefs. Values coding infers the 'heart and mind' of an individual or group's worldview as to what is important, perceived as true, maintained as opinion and felt strongly (Saldaña 2011, 105). During this phase of the analysis, two new frames emerged from the data: *Criminal Culture* and *Foreign Cultural Influences*.

The data were first coded manually and then with the assistance of NVivo software in order to exploit the benefits of computer-assisted qualitative data analysis. Using NVivo made it possible to quantify the data corpus and count the frequency of themes and codes thus allowing patterns and idiosyncrasies to emerge and making it possible to document analytic moves and verify interpretations (Sandelowski et al. 2009, 3).

Findings

Frame Analysis

The frame analysis revealed that six crime frames comprised Antigua's catalogue of crime frames:

Faulty System: Crime stems from the failure of the criminal justice system to apprehend and punish offenders. It's no wonder there's so much crime, criminals know they can do whatever they want to do and get away with it. If we're serious about fighting crime then the police need to get 'tough'. Only when more criminals are made to do hard time will the message get out that 'crime doesn't pay'.

Blocked Opportunities: Crime stems from poverty, unemployment, poor education, bad housing and class discrimination. Kids come from places like Gray's Farm and Point turn to crime when they don't see any opportunities for legitimate work. If we're serious about fighting crime, we need to create more opportunities for disadvantaged kids. We'll only make progress in the fight against crime when we begin to seriously address these 'root causes'.

Social Breakdown: Crime stems from a breakdown of the traditional family and traditional community. In the past, there was less crime because neighbours looked out for one another and parents supervised and disciplined their children. The best way to fight crime is for neighbours, in partnership with the police, to band together to restore order to their communities.

Poor Immigration Control: Crime stems from poor immigration control. Most of the crime that occurs is committed by 'non-nationals'. If we're serious about fighting crime, we need to crackdown on the number of non-nationals that come into this country - especially those from Jamaica and Guyana.

Criminal Culture: Crime stems from excessive contact with systems and authorities that send pro-crime messages. It's no wonder there is so much crime, when there is widespread corruption among government officials, prominent business people and in government institutions, and when the justice system treats people differently based on who they are and who they know, people feel justified in cutting corners and breaking the law themselves. If we are serious about fighting

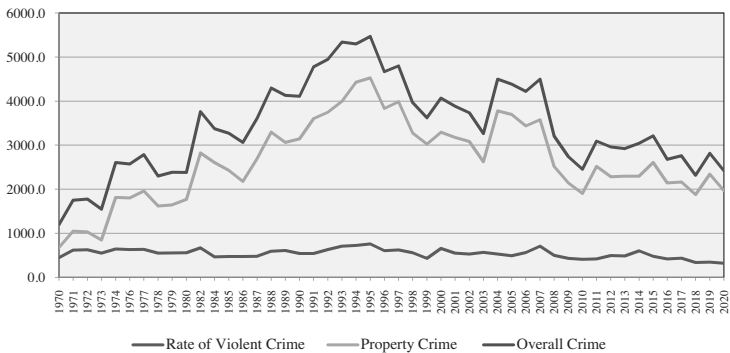
crime, we need to stamp out corruption, in all of its forms, wherever it occurs and maintain a transparent justice system that treats everyone equally irrespective of wealth or status.

Foreign Cultural Influences: Crime stems from foreign cultural influences. Most of the crime that occurs reflects patterns of criminality that are not indigenous to Antigua and Barbuda. If we are serious about fighting crime, we need to protect our culture from outside influences that have crept into our society through the Trojan Horse of criminal deportees returned from the United States, Canada and the United Kingdom, as well as the Internet, American cable television, music and Caribbean immigrants.

Reported Crime Trends

This study created a longitudinal account of crime in Antigua and Barbuda in order to better assess the claims made by the news media and members of the public. The data suggest that that the rate of recorded property crime increased significantly from 1970 to its peak in 1995 and declined, albeit unsteadily, from 1995 to 2010 and remaining stable from 2011 to 2020. Unlike most other countries in the Caribbean, property crime reports in Antigua and Barbuda have remained more prevalent than those of violent crime. In fact, since 1974, at least 70 per cent of all crimes reported have been property related (see Figure 2).

That the vast majority of reported crime has been property related is not surprising and is consistent with crime patterns emerging from official police data in most developing countries (Buendia 1989, 415), England and Wales (Maguire 2007, 255) and other countries in the Anglophone Caribbean (Harriott 2000, 9-10; UNDP 2012, 20). What is



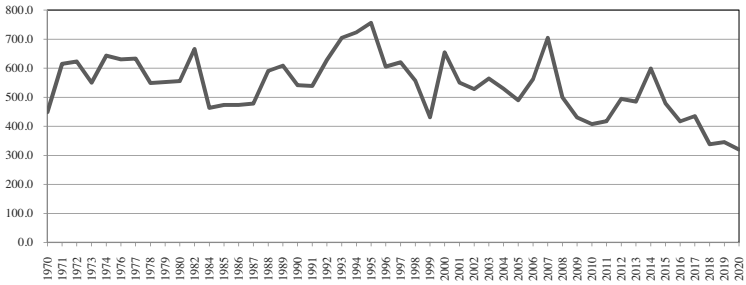
SOURCE: RPF Criminal Records Office

Figure 2: Violent, Property and Overall Crime Rates 1970–2020
Source: RPF Criminal Records Office

perhaps more surprising, however, is that from 1970 to 2010 the ratio of property crime reports relative to violent crime reports have generally increased rather than decreased. From a ratio of 2:1 in 1970 to as much as 8:1 in 2005 and 6:1 in 2020, the data as captured by official statistics suggest that police are responding to a lower proportion of violent crime reports now than they did in 1970. This apparent trend defies the trajectory of reported crimes elsewhere in the Commonwealth Caribbean where the ratio of property crime reports relative to violent crime reports have decreased (see Harriott 2000, 9–10; UNDP 2012, 20). This trend also defies much of the public discourse surrounding crime in Antigua and seems to cast doubt on the characterization of Antigua's crime as mostly violent. One possible explanation for this counterintuitive trend is that over time the reporting behaviour of the public changed with respect to property crime. Over the first 25 years of the period, for example, as property insurance may have become a more prominent feature of society, there would have been a greater incentive to report property crimes to the police in order to support insurance claims. As such, the growing proportion of property crime reports during this time might actually represent a decline in the overall number of property crime reports that were never brought to the attention of the police. The vast majority of these property-related reports involve larceny and appear to be largely opportunistic crime. Reports of this type of crime appear to more frequently involve the three streets in downtown St. John's most travelled by tourists. Although property crime reports are more prevalent than those of violent crime, the data nevertheless revealed disconcerting trends with respect to violent crime.

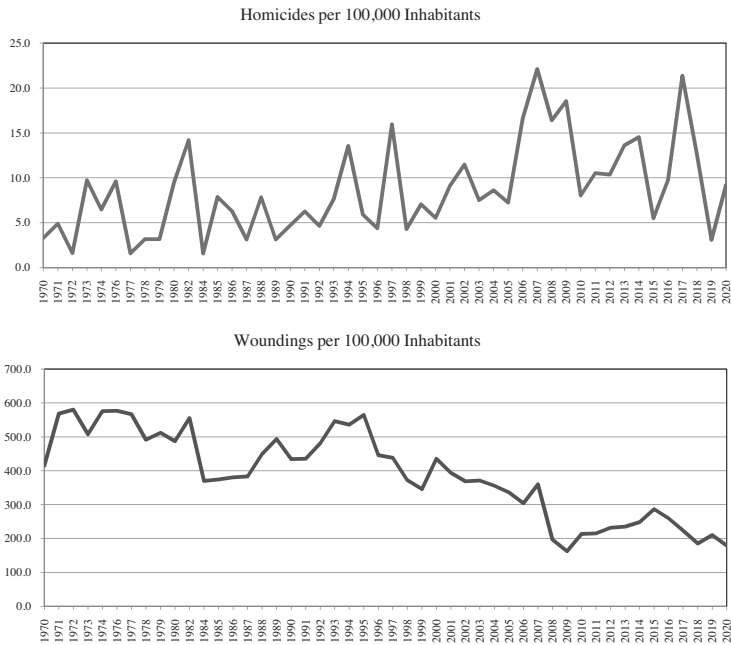
Over the course of the 50-year time period, the overall rate of reports of violent crime remained relatively stable although there was a slight downward trend from 2007 to 2010 and again from 2014 to 2020 (Figure 3). However, although the level of violent crime reports remained relatively stable, there were significant changes in the ways in which the violence manifested.

That is, there were changes in the types of violent crimes reported. According to official police data, since the mid-1990s there has been a slight upturn in the incidence of homicides while there has been a corresponding decline in reports of wounding (Figure 4). With the simultaneous increase in reported gun crime, it seems plausible that the number of violent altercations may not have changed significantly, but the increasing use of guns may have ensured more deadly outcomes. The use of guns



SOURCE: RPF Criminal Records Office

Figure 3: Rate of Violent Crime 1970-2020
Source: RPF Criminal Records Office



SOURCE: RPF Criminal Records Office

Figure 4: Rate of Homicides v. Woundings 1970-2020
Source: RPF Criminal Records Office

may have caused death in cases where the victim in earlier years may otherwise have been wounded.

Between 2007 and 2009 police documented a major conflict between international illegal drug suppliers and local drug dealers, which

accounted for spikes in homicide at that time. The homicide rate in 2010 decreased dramatically returning to a rate more in line with pre-2007 levels. Similarly, there was a flurry of drug activity in 2017 where the homicide rate again spikes before returning to levels in 2019 that were unseen since 1979. While homicide continues to account for a very small percentage of total crime and of violent crime more specifically, since 1990 there was a relatively steady increase in robbery, which composed of approximately one-third of violent crime from 2006 to 2020. The data also suggest that, compared to other Caribbean countries, the rate of sexual violence in Antigua and Barbuda is high (see, for example, UNDP 2012). In recent years, rape and indecent assault have accounted for as much as 20 per cent of violent crime. This trend became more acute between 2006 and 2009 when the incidence of rape doubled. During this time, it is alleged that there was 'serial rapist' at large. Even with these trends in violent crime, however, official police data suggest that at no point since 1982 have reports of violent crime exceeded 18 per cent of total crime reports.

Perceptions of Crime in the Antiguan Public and News Media Discourses

Newspaper Discourse

With nearly half of all newspaper articles suggesting that crime stems from the failure of the criminal justice system to apprehend and punish offenders, *Faulty System* was the most prevalent frame in the newspaper sample. Of the articles displaying the Faulty System frame, approximately half associated high crime rates with police ineptitude and ineffectiveness while slightly less than half argued for stiffer penalties. For example, a 2005 article entitled 'Shake-Up At Dockyard Police Station' asserts that the lack of police visibility at Falmouth and English harbours may have 'given the criminals license for the recent spate of robberies on yachts moored in the area...' (*The Daily Observer* 2/16/2005: 1), and, in a 2007 article entitled 'More Residents Blast Police' the writer chronicles the woes of residents who 'complain bitterly about members of the Royal Police Force of Antigua and Barbuda' relaying that:

The man, in a telephone interview, chided the police for promising to come to the scene, and not doing so sooner than three hours after the call. 'I calling the police, I call 911, I call St. John's [Police Station] and I call C[riminal] I[nvestigation] D[eartment] and the police keep telling me somebody is going to come for the past three hours,' the Trini said. 'Until now, no police have showed up. I really angry, and

somebody could ah dead,' he said. 'I have to ask the woman at 911 if only when somebody dead they going to show up'. (*The Daily Observer* 2/19/2007: 16)

In those articles arguing for stiffer penalties, writers bemoan the perceived lack of severity in dealing with offenders, including at-risk youth, articulating the legal maxim, 'justice must not only be done, it must be seen to be done'. For these writers, like the proponents of classical criminology, courts and other criminal justice institutions must send a clear message that 'crime does not pay'. The overall message of these articles is best captured by the 2006 article entitled, 'Former Educator: Spare The Rod, Spoil The Child', in which a former educator is quoted as saying:

In Antigua we are becoming too loose, and we are sorry for the person who commits the crime and not the victim... Young people are going into people's houses, stealing and reverting to violence. And instead of dealing with them appropriately, we have this soft approach to the problem, and it is not working because they laugh at us and keep on committing the crime. (*The Daily Observer* 2/9/2006: 6)

In making this point the vast majority of writers call for stiffer penalties generally, however, a small number of writers call for increased use of the death penalty or a strict boot camp for young people specifically.

As seen in Figure 5, *Faulty System* was followed most closely by *Social Breakdown*, which appeared in just over one-third of the newspaper articles included in the sample. These articles unanimously supported the idea that crime stems from a breakdown of the traditional family and traditional communities. Over two-thirds of these articles were prescriptive calling for collective action as a means of restoring order while slightly less than one-third were diagnostic arguing that Antigua and Barbuda had experienced

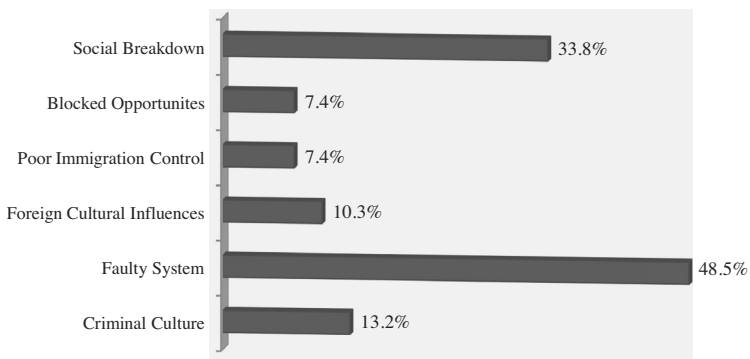


Figure 5: Frame Performance in Newspaper Discourse
 Source: RPF Criminal Records Office

such moral degradation over time that crime was the inevitable result. For example, in his letter to the editor John Richards asserts, 'What we need is unity and community effort to fight crime. Ours is a Christian society that requires us to be our brother's keeper' (*The Daily Observer* 2/1/2000: 3). Similarly, in a 2006 article entitled 'Gov't to Focus on Preventing Youth Violence' the Prime Minister calls for 'the strengthening of partnerships between the government, the school, the home, the church, community-based organisations and the business community' (*The Daily Observer* 2/28/2006: 5). In the vast majority of these articles, writers compare contemporary times to a more genteel time of yesteryear where 'children were raised to become decent and law-abiding citizens of the land' (*The Daily Observer* 2/2/1998: 2), when 'police used to do foot patrol and not just be mobile' (*The Daily Observer* 2/20/2006: 4) and 'the main causes of death for [young people] would be a vehicular accident or a rare debilitating illness' (*The Daily Observer* 2/27/2007: 2). In the writers' historical imaginations, neighbours looked out for one another, the extended family was paramount, and social institutions were strong. Collectively, the articles paint a dystopian portrait of an Antigua and Barbuda currently in the midst of social crisis. The excerpt below illustrates the point:

It is clear that an alarming plague of social dry rot has set in. The plague is upon our homes and families; it is upon our churches and upon our schools. Indeed, it is upon our Government, which is deemed to be one of the most corrupt in the whole wide world. (*The Daily Observer* 2/10/1998: 2).

Thus, in line with Sasson's (1995) findings in the United States, Antiguan and Barbudan newspaper discourse appears overwhelmingly to blame crime on a poorly functioning criminal justice system and moral failure.

However, just as important as what Antigua's newspaper discourse blamed for the country's perceived crime problem is what it rejected and ignored as possible causes. *Blocked Opportunities* was one of the least prevalent frames found in the newspaper discourse, appearing in just over seven per cent of all articles. Each article that conjured the frame did so for the purpose of rejecting it. Consequently, the only newspaper articles in which the *Blocked Opportunities* frame appeared, rejected the idea that crime stems from such structural impediments as poverty, unemployment, poor education, bad housing and class discrimination. For example, in a 1995 court news report entitled 'Commentary on Crimes of Violence' the writer laments:

We are advised and are alarmed that even in the nation's best schools, pupils from privileged backgrounds are turning up armed with handguns, knives and ice picks

at the ready, to do serious injury to their schoolmates and the wider public at the slightest provocation and sometimes without any provocation at all (*The Daily Observer* 2/23/1995: 7)

Similarly, in a 2000 editorial entitled 'Courts Should Impose Appropriate Sanctions' a judge adjudicating a case is quoted as telling a young first-time offender, '[y]ou come from a good home, a good background. You are supposed to set a good example...' (*The Daily Observer* 2/28/2000: 2) And, in a 2006 front page article entitled 'Gang Members Tell Tales,' reporter Nasheta Richards quotes an anonymous female gang member pondering the involvement of certain other female gang members in an illegal prostitution ring saying, 'some of [the girls] from private schools don't even need the money, cause their parents have plenty' (*The Daily Observer* 2/13/2006: 1). Although the surprise that is articulated in each of these examples suggests an underlying assumption that criminal behaviour is the domain of those who do not have access to the best schools, are not from privileged backgrounds and are not from 'good homes', it is an assumption that is directly being challenged.

The Poor Immigration Control frame had an equally poor showing in the newspaper discourse also appearing in just over seven per cent of all articles. These articles associated crime not with increased immigration but with indiscriminate immigration. In this discourse, certain immigrants were to blame for increased crime. For example, a 1994 article expresses explicit concern that foreign-born persons of unsavoury character may have been responsible for a murder involving four victims:

It is true that, wittingly or unwittingly, foreign persons of unsavory character from the Caribbean region and beyond have been let into our country and from time to time, have been allowed to rehabilitate themselves, to construct and conduct decent lives for their families and themselves. Even if we have not been exactly enthusiastic about their presence among us, they have been permitted to carry on the business of 'living' provided they conduct themselves with due regard for the law, and respect for our institutions and our countrymen. Such is the nature of our imperfect society. But, even in this imperfect society there can be no solace, no room for foreign mercenaries, murderers, or those found guilty of crimes of moral turpitude. (5)

The one article that implicitly links 'less than desirable' immigrants with an increased crime rate reflects thinking akin to Sellin (1938) and Sutherland's (1947) suggestion that certain types of crime are more prevalent among specific immigrant groups. In a 1999 article entitled, 'Guyanese Man Narrowly Escapes Deportation,' the Chief Magistrate associates with Guyanese nationals the crime of receiving stolen goods as he proclaims,

'I don't have anything against Guyanese but it seems to me most of these crimes seem to involve Guyanese, and I am beginning to wonder why' (*The Daily Observer* 2/16/1999: 6). While the news media locates the causes of crime within individuals, it rejects overtly structural explanations.

Public Discourse

Faulty System was the most successful frame in public discourse. This success was determined not only by the frame's unanimous support in eight out of ten peer group discussions but also by the unparalleled support it received from the vast majority of discussion participants (more than nine out of 10) and the fact that it was the only frame that garnered support from participants in every peer group discussion. Nearly all of the participants enthusiastically argued that the institutions comprising Antigua and Barbuda's criminal justice system are broken and thus antithetical to ensuring swift, certain and severe punishment. Mary's sentiment underlies the basic tenor of this supportive argument:

[The criminal justice system is] not efficient. No government office is efficient. Not one - not a single one. You go down to legal affairs and they don't have filing systems. They cannot find files and that is - I mean, I work in a government office and we've had court cases brought against the government and the legal department cannot find files, which are essential for cases. When the key bodies aren't functioning correctly and efficiently I don't know how anything else falls into place.

In five out of ten discussions participants focus on police ineffectiveness and the lack of resources available to the police, and in seven out of ten discussions participants complain bitterly about the lack of professionalism within the police force. The excerpt below is illustrative as Toji responds to the frame's prompt by saying:

The reason I agree with that is because a lot of people probably wouldn't get into crime in the first place if it was like we have an intelligent police force that's going to get you most of the time. I think a lot of kids around here are just idle and it seems far too easy to them and that's what motivates them.

Additionally, most participants called for stiffer penalties, including increased use of the death penalty, castration for 'the people who are raping school children,' and life in prison for those who rape. In these discussions, participants in four peer groups decry seemingly short prison sentences and inexpensive fines as a 'slap on the wrist' that does little to deter the offender from reoffending. In this regard, these results are in line with the penal populism that has come to characterize such places as the United States and the United Kingdom.

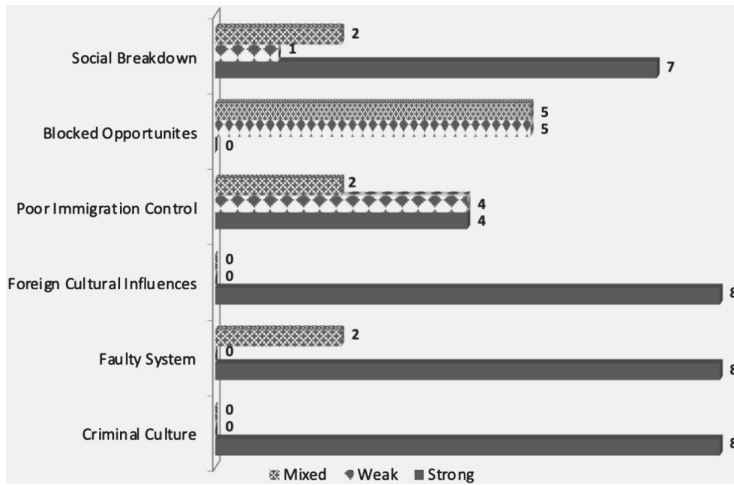


Figure 6. Frame Performance in Peer Group Discussions (N=10)

Although the Social Breakdown frame received unanimous support in seven out of ten peer group discussions, the Criminal Culture and Foreign Cultural Influences frames were slightly more successful (Figure 6). Emerging without any prompts from the interview guide, *Criminal Culture* and *Foreign Cultural Influences* appeared spontaneously in eight out of ten peer group discussions. While these frames were mostly offered as explanations for crime independent of any other frame, many participants invoked the *Criminal Culture* frame to highlight the failings of the criminal justice system and the *Foreign Cultural Influences* frame to show how adopting foreign influences contributes to the breakdown of traditional cultural values. As such, the support for these frames provides further evidence of the notion that Antiguan largely blame crime on a poorly functioning criminal justice system and moral failure. At first glance, this finding, coupled with the negative reactions to the *Blocked Opportunities* frame, confirms Sasson's (1994, 162) research demonstrating that public discourse reflects an 'ingrained aversion to structural criminology'. However, a closer look at the peer group discussions also revealed an understanding that is more nuanced. While there was a general aversion to structural explanations of crime, at least one participant in five discussion groups articulated support for the *Blocked Opportunities* frame and participants in a small number of peer group discussions added a structural dimension to discourse that was otherwise very individual. For example, a small number of participants located family breakdown

within the context of a flailing economy that forced single mothers to work two jobs. This is evident as one participant explains, 'could be wrong but I think nowadays more single mothers, women, have at least two jobs and don't have as much time with the children'. Similarly, a small number of participants suggested that some parents parent poorly because they were parented poorly themselves. For example, one participant notes:

What I have found is that the whole concept of passing values onto children has changed. It has changed - I think parents used to verbalize dreams for children - help their children to establish things they want out of life, encourage them to set goals and that sort of thing and I'm not so sure that this is a big conversation piece...[because] I think by and large most of the parents are really very young - haven't had that passed on to them and therefore haven't been able to hold that conversation easily.

Despite its absence from the media discourse, the presence of a structural understanding of crime in the public discourse suggests the possibility for a broader political discourse - a more mature political discourse - and by extension better policy decisions.

Conclusion

Public Knowledge of Crime

Although further research is required, this study suggests that Antiguans are generally ill informed about crime though they may have a clearer sense of the trends in the crimes that matter most to them. In keeping with the findings of Hough and Roberts (2012) covering England and Wales, the participants in this study overestimated the magnitude and direction of crime when compared to official crime data. Amidst falling property crime rates and a relatively stable but downward trend in rates of violent crime, the vast majority of the participants in the study claimed that crime was increasing. Similarly, the claims that participants made with respect to the *Social Breakdown* frame, that there was much less violence in the past and homicides in the 1970s and 1980s were virtually non-existent, are not borne out by the data. As one of the few Caribbean countries for which such a study exists, the Barbados case is instructive. While official crime data show that only 20 per cent of the crime that occurred in Barbados between 1997 and 2002 involved violence, over 40 per cent of Barbadians believed that more than 75 per cent of crimes involved violence and nearly 70 per cent of Barbadians believed that it was more than 50 per cent (Nuttall et al. 2003). Official crime data suggest Antiguans similarly misperceive the prevalence of violent crimes. As per Figure 3 above,

violent crime was as prevalent in the 1970s and 1980s as it was at the turn of the millennium and as seen in Figure 4 there were as many as 10 and 14 homicides per 100,000 people in the 1970s and the 1980s, respectively. Additionally, official crime data disprove claims that crime 'skyrocketed' or 'increased tremendously' since 2004 when the United Progressive Party won the national election. In fact, as stated earlier and as shown in Figure 2, property crime reports are on the decline, and, with few exceptions, the general trend for violent crime is downward.

Newspaper Portrayals of Crime

This study confirms Surette's (2003, 41; 2015, 59) 'law of opposites' or 'backwards law'. Antigua's newspaper crime articles overwhelmingly emphasize the opposite of whatever crime trends and patterns emerge from official crime data. While official crime data suggest that incidents of property crime outstrip those of violent crime at a ratio as great as 8 to 1, newspaper articles reflect almost exactly the opposite. With nearly 60 per cent of the newspaper sample focused on incidents of violent crime and less than 10 per cent focused on incidents of property crime, the ratio of property crime stories to violent crime stories is roughly 1 to 8. These findings are also in keeping with Chadee and Ditton's (2005) work in Trinidad and Tobago. The 'law of opposites' similarly holds true with respect to homicides, violent crime and characteristics of the victims. While official crime data suggest that homicides represent less than 1 per cent of all recorded crimes, in the newspaper, stories about homicide account for approximately 13 per cent of crime-related articles. While official crime data suggest a relatively stable rate of violent crime, newspaper crime articles suggest that this rate is increasing by making such declarations as '...the ever-increasing incidences of violent crimes...seems to be gaining a toe-hold in this once peaceful country' (*The Daily Observer* 2/23/95, 7) and 'the trend [of elderly women being brutally attacked in their homes] is disturbing. It would seem that violent crime is on the rise in Antigua' (*The Daily Observer* 2/13/96, 1). The latter article is also an example of this newspaper's tendency to exaggerate the risk of victimization for the elderly and others who are the least likely to be victimized. Nearly one-third of the articles in the sample reflected this tendency, which also confirms Greer and Reiner's (2012) findings in Britain.

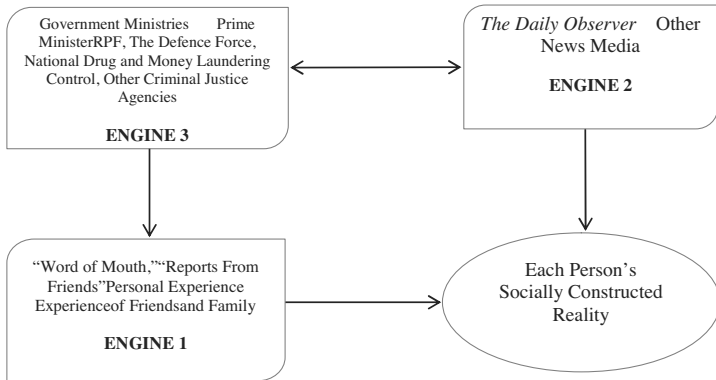
The Social Construction of Crime in Antigua and Barbuda

The findings of this study also suggest that Antiguan and Barbudans are not passive consumers of news media. While over 90 per cent of the

participants in the group discussions cited the news media as their source of crime and criminal justice knowledge, the frames that were most prevalent in the newspaper discourse were not the frames that participants most widely embraced (Figure 3). For example, *Foreign Cultural Influences* and *Criminal Culture*, two of the least prevalent frames in the newspaper discourse, were among the strongest performing frames in the public discourse. As was the case in Boda and Szabó's (2011) research in Hungary, some Antiguans had little faith in the news media expressing extreme scepticism about many of the criminal justice claims made in the newspaper. Antiguans were more inclined to trust the information they received from close friends, family and acquaintances. Indeed, 95 per cent of participants cited 'word of mouth', 'reports from friends' and the experiences of family members as the sources of their crime knowledge while a much smaller minority cited their own personal experiences with the criminal justice system. As such, there is support for the proposition that Antiguans acquire social knowledge and construct their own version of reality in much the same way that Gamson (1992), Surette (2015) and others have described elsewhere. That is, Antiguans derive their crime knowledge from a combination of what Surette (2015) calls the 'engines of social construction' – direct first-hand experience with crime, information received directly from close friends, family and acquaintances ('Engine 1'), the news media ('Engine 2'), and statistical and other crime information disseminated by criminal justice agencies and organizations ('Engine 3') (Figure 7). Gamson (1992, 180-1) sheds additional light on this point by suggesting

People who [derive their crime knowledge from a combination of sources] are selectively influenced by the relative prominence of media frames, responding to the degree that these frames are consistent with their popular wisdom and experiential knowledge. They are constrained by omissions from media discourse but relatively immune to differences in the relative prominence of visible frames.

Beyond the suggestion that Antiguans and Barbudans do not passively receive the news media, the inverse relationship that exists between certain frames in the newspaper and public discourse may have another meaning. This disconnect provides support for the structural argument that Antigua and Barbuda's newspaper reproduces dominant ideology and promotes the interests of the ruling elite and legitimates the existing system (see, for example, Greer and Reinder 2012). Put differently, Antigua and Barbuda's newspaper appears to frame crime in ways that do not significantly undermine the Members of Parliament responsible for public safety and other high-ranking government officials. For example, the *Foreign*



SOURCE: Adapted from Surette, R. 2015. *Media, Crime and Criminal Justice*. Pg. 54. Stamford, CT: Cengage

Figure 7. Surette's Engines of Social Construction as Applied to Antigua and Barbuda

SOURCE: Adapted from Surette, R. (2015). *Media, Crime and Criminal Justice*. Pg. 54. Stamford, CT: Cengage

Cultural Influences, Poor Immigration Control and Criminal Culture, the frames most critical of the criminal justice and political systems, are the frames that are least prevalent in the newspaper discourse. Similarly, every article that displayed the *Blocked Opportunities* frame in the newspaper discourse did so in order to reject its veracity. This finding is consistent with the structuralist approach to news media research, which is informed by Marxist and critical theory. Greer and Reiner (2012) argue that the most coveted sources of statements and crime information are the police, Members of Parliament responsible for public safety and other high-ranking government officials who are deemed to be most credible. As such, crime reporters become the mouthpiece of the police and the criminal justice system as they depend on an amicable relationship with these sources. The result is crime reporting that inevitably relies on and reproduces the institutional views of these sources. But, the relationship is a symbiotic relationship because these sources also rely on the media to disseminate their claims. As Surette (2015, 53) explains,

'[l]ittle knowledge can be disseminated directly from these institutions and organisations to individuals, so agencies and institutions of the third engine must utilize the media for effective distribution of their factual and interpretative claims'.

Policy Implications and Recommendations

As Sasson (1995) and others explain, constructionist investigations of crime are important because understanding how crime is framed in terms

of causes and remedies necessarily influences who we criminalize, what legislation we pass and how we allocate our tax dollars. As such, framing crime in ways that are tinged with hyperbole, or that run contrary to evidence is unlikely to result in effective policy responses. The way in which crime is currently framed in Antigua and Barbuda – as a relatively recent phenomenon that is spiralling out of control and is characterized by increasing violence, as a phenomenon that is perpetuated by predatory young people with individual pathologies, as a phenomenon that is increasing largely because police and politicians are corrupt and young people are being inculcated with foreign cultural values – has resulted in punitive policy and ‘tough on crime’ rhetoric that do not appear to have had a substantial effect on the country’s crime rate. However, this study finds that there might be room for more progressive crime policy – policy that is informed by an understanding of crime that does not have at its heart notions of law and order or getting ‘tough on crime’.

First, criminal justice policy that is rooted in overtly structural conceptions of crime is not likely to succeed in Antigua and Barbuda. As the *Blocked Opportunities* frame was the worst performing frame in the study, both the news media and the public seem to have an aversion to explicit causal connections between crime and poverty, unemployment, poor education, bad housing and class discrimination. This finding is hardly surprising given that Antigua and Barbuda is not a country with many social safety nets or the expectation thereof. While there are national social security and medical benefits schemes, there is no welfare, unemployment insurance or universal healthcare scheme. Government subsidies are few and far between. Personal responsibility is a strong cultural meme. You pull yourself up by your bootstraps because there is no one else who will pull you up. Government surely does not have the means to assist when there have been so many times that government has been unable to pay its own workers. Against the backdrop of Antigua and Barbuda’s slave and colonial history, as one participant explained, most Antiguan and Barbudans are not more than a generation or two removed from poverty. Most Antiguan at some point would have had to overcome structural obstacles. Structural obstacles then are not excuses to turn to crime, they are the impetus to better oneself and get ahead. It is important to note that rejecting this frame also insulates and protects politicians and public figures. Politicians and government agents are not held accountable in ways they might be if crime was seen more as a public failing.

Interestingly, however, attributing crime to a breakdown of the traditional family and traditional community resonates strongly with both the

public and the news media. One could argue that this is very much a structural argument especially given that some members of the public demonstrated a more nuanced understanding by locating the causes of this social breakdown in economic insecurity and inequality. As such, reframing the crime debate in terms of the *Social Breakdown* frame while incorporating subtle structural arguments will likely allow for more mature political discourse and, as a result, a criminal justice policy differently oriented. It may be that Antiguan and Barbudans do not see this frame in such stark structural terms because the frame seems to contemplate a public private divide. That is, there is no reliance on or expectation of government. The unemployment, discrimination, poverty and inadequate schools described by the *Blocked Opportunities* frame may well feel more like public problems falling squarely within the ambit of government while family, parenting and neighbours looking out for each other may better comport with individual choice and personal responsibility. The government has no control over how and by whom children are disciplined and whether neighbours speak to each other. The components of *Social Breakdown* may initially be understood as private issues within the private domain. As such, although a recent evaluation of the Chicago Area Project did not support its crime preventive effects, criminal justice policy should nevertheless exploit the resonance of the *Social Breakdown* frame by incorporating a bottom-up approach focused on social organization and community stability.

This study also finds that members of the public have a deep concern with issues of procedural justice, legitimacy and 'broken' institutions even where media discourse does not. The *Daily Observer* may be less inclined to print articles invoking the *Criminal Culture* frame because newspapers rely on politicians and government officials in ways previously discussed. Again, ignoring such issues as procedural justice and 'broken' institutions may be a way to insulate politicians and government officials from being accountable. But given the purchasing power that the frame enjoys with members of the public, criminal justice policy should focus in part on transparency and reflect as much concern about corruption and white-collar crime as it does about street crime and low-level drug offending. Additionally, the criminal justice system must be seen to treat everyone equally irrespective of wealth or status. UNDP (2012) found that Antigua and Barbuda is the only Caribbean country included in the study not to have an internal police investigative unit aimed at investigating corruption and ensuring professional standards. This deficit should be rectified as a first step towards transparency and repairing

the negative perceptions that Antiguan and Barbudans have with respect to notions of a 'criminal culture'.

Finally, Surette (2015) and others have found that while the news media are not often found to be direct causes of criminal justice policy shifts, they do contribute to a larger social system that generates and preserves the dominant attitudes about crime and criminal justice. In Antigua and Barbuda, as is the case in other jurisdictions, the news media constructs crime as being divorced from other social realities, perpetrated by predatory young people with individual pathologies, who have free will and a wide range of choices. News coverage of crime does not often provide the public with enough contextual insight to evaluate the criminal justice system's performance or better understand individual criminal incidents. Given that the vast majority of participants (more than nine out of 10) cited newspapers as one of their sources of crime knowledge, better crime coverage could influence shifts in criminal justice policy. Following Surette's (2015) suggestion, that the news media cover crime in the manner in which they cover sports and may positively influence criminal justice policy in Antigua and Barbuda. If the news media provided comprehensive, contextual coverage of crime on a daily basis, the way they cover West Indies cricket, if reporting still focused on individual events, but also included statistics, trend analysis, forecasts, commentary and emphasized both historical understanding and current significance, members of the public would be better informed and less inclined to embrace or support punitive criminal justice policies.

The point of this study is to show how a mixed methods research design can yield a richer understanding of an issue being studied. This mixed methods investigation reveals that there are two different narratives at play with respect to crime and crime policy in Antigua and Barbuda. What seems clear is that Antigua and Barbuda has always had disconcerting levels of crime deserving of attention contrary to the narrative that crime has spiralled out of control in recent times. And, such historical understanding can temper the hysteria and impulse to 'just do something' without thinking through solid evidence-based approaches.

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Nursing Students' Knowledge and Attitudes to Child Abuse and Neglect in Jamaica: A Mixed Methods Study

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Abstract

Our aim was to assess nursing students' knowledge and attitudes to child abuse and neglect (CAN) and to determine whether knowledge of CAN significantly predicts nursing students' attitudes to dealing with CAN. We also explored nursing students' understanding and attitudes to dealing with CAN and their perception of the role of the BScN curriculum in providing exposure to CAN. A convergent mixed methods research design was employed where we collected data simultaneously from questionnaires and focus group discussions. Quantitative results indicated that while the existing curriculum provided the necessary support for nursing students' knowledge and attitude to CAN, qualitative findings showed deficiencies in their knowledge and application in clinical practice. Students' knowledge and experiences on CAN were gained mainly from vicarious learning. Also, there was no significant relationship between students' knowledge and attitudes to dealing with CAN. Curriculum developers need to consider overtly incorporating CAN in nursing curricular to better prepare students for dealing with CAN as first responders to protect children from abuse and neglect. The study contributes to the literature as an example of how a mixed methods approach can highlight inconsistencies in research findings that would not be easily identified using a mono research method.

Key words: child abuse and neglect; convergent mixed methods research; nursing students; nursing curriculum.

The quantitative component of this study was presented at the II ISPCAN Caribbean Regional Conference, Montego Bay, Jamaica December 1–5, 2018.

This entire study was presented at the 2019 MMIRA Asia Regional & JSMMR2019 Conference, Hamamatsu, Shizuoka, Japan – September 14–16, 2019.

Introduction

Jamaica is home to approximately 2.9 million people and nearly 26 percent account for children under 18 years old (STATIN 2017). Jamaica ratifies the Convention on the Rights of the Child and makes significant strides in meeting its international obligations to protect its children (Rattray 2019). Yet, current and available data show nearly 100,000 reports of suspected cases to the National Child Registry of child abuse and neglect in a 10-year period during 2007–2017 (CPFSA 2014a). Neglect is the most reported, accounting for over one-third of these cases (39.7%) (CPFSA 2014a). There are also reports of sexual abuse (24.6%), physical abuse (21.4%), emotional abuse (11.9%) and trafficking and child labour (2.4%) (CPFSA 2014a). While these administrative data are drawn from unsubstantiated reports, they provide a troubling scenario for CAN in Jamaica.

Child abuse and neglect (CAN) refers to a deliberate act of commission, or failure to act (omission) by parents or caretakers, that may result in death, physical or emotional harm, sexual assault, exploitation involving a child or deliberately withholding care (CPFSA 2014b). The Child Protection and Family Services Agency (CPFSA 2014b) describes types of abuse as physical, sexual, emotional, psychological abuse, neglect, trafficking and child labour. There are many potentially harmful outcomes of abuse and neglect to the child, particularly to the child's physical, psychological, cognitive, behavioural and social development (Hunter, 2014; Weaver, 2014). Families, communities and the wider society are also impacted by CAN. For instance, a total financial burden that is caused by CAN is approximately USD\$210 000 over the lifetime for each child surviving its effects, "with a conservative estimated total cost of USD \$124 billion a year" (Ferrara et al. 2015, 1457). This suggests that it is more cost effective to prevent children from exposure to abuse and neglect than to treat incidences and its associated deleterious outcomes.

Preventing CAN is a national and international priority (Rattray 2019). In Jamaica, nurses have a legal obligation according to the *Child Care and Protection Act 2014* to intervene when children are at risk of abuse and neglect. They are primary responders who play a vital role in protecting children through prevention, detection and response to CAN (Lines, Grant, Hutton 2018). Therefore, managing CAN require a very specific repertoire of knowledge and skills (Lines et al. 2018; Lines, Hutton,

and Grant 2017; Poreddi et al. 2016). Currently, there is no evidence to indicate whether existing nursing curricula in Jamaica overtly support nursing students with the required knowledge skills to deal with CAN which we aim to investigate in this study.

Previous research on CAN

Previous research indicates that healthcare professionals may not always be equipped with the knowledge and skills necessary to prevent, detect and respond to CAN (e.g., Markenson et al., 2007; Alnasser et al. 2017; Alsaleem et al. 2018; Sathiadas, Viswalingam, and Vijayaratnam 2018; Markovic et al., 2015). Lines and colleagues (2017) find that nurses report having insufficient knowledge and lack of confidence in their role to effectively respond to CAN which can lead to failure in recognizing the occurrence of the problem. Yet, very few studies are conducted to ascertain nursing students' knowledge and attitudes to dealing with CAN.

In the international literature, a study on Saudi Arabian nursing students reports just over half of the participants are able to correctly answer questions relating to identification of suspected cases of CAN (Elarousy, Helal, and de Villiers, 2012). Similar findings are found in a study of nursing students in India that utilizes the same knowledge and attitude scale as Elarousy and colleagues (2012). Poreddi et al. (2016) report that almost half of their participants correctly answer the knowledge questions and conclude that these students have inadequate knowledge of CAN. Whereas, findings from a Turkish study indicate that nursing students who complete a course covering CAN had moderate knowledge of CAN (Ozbey, Ozcelep, Gul, and Kahrirman, 2018). In addition, some demographic factors are identified in the literature as playing a role in nursing students' knowledge on CAN. For example, females (Ozbey et al. 2018), older students (Poreddi et al. 2016), completing a course that cover CAN (Elarousy et al. 2012; Ozbey et al. 2018), and final year students (Poreddi et al. 2016) significantly increase nursing students' knowledge on CAN.

As for attitude to dealing with CAN, nursing students seem to have positive attitudes towards preventing CAN (Poreddi et al. 2016; Elarousy et al. 2012). Also, there is evidence in the literature to indicate that older students have a more positive, overall attitude to CAN than their younger counterparts (e.g., Elarousy et al. 2012; DeMattei, Sherry, Rogers, and Freeman, 2009; Poreddi et al. 2016). Completing a course that covers CAN and final year students significantly relate to nursing students'

attitudes to dealing with CAN (Elarousy et al. 2012; Poreddi et al. 2016). Notably, the literature shows that among nursing students, knowledge of CAN does not significantly associate with one's attitude to dealing with CAN (Elarousy et al. 2012).

In summary, the literature suggests that CAN-inclusive curricula have the potential to reduce the prevalence of CAN in Jamaica with nurses, as first responders, playing a vital and instrumental role in protecting children by preventing, detecting and responding to CAN. Further, there is no published literature in Jamaica on nursing students' knowledge and attitudes to dealing with CAN. Finally, there is no evidence to indicate whether existing nursing curricula in Jamaica facilitate future nurses with the required knowledge and skills to prevent, detect and respond to CAN.

Study aims and research question

Our aim was to assess nursing students' knowledge and attitudes to dealing with CAN. Also, we expected that knowledge of CAN increases attitudes to dealing with CAN, therefore our second aim was to test this relationship. Our third aim was to explore nursing students' understanding and attitudes to dealing with CAN as well as their perception of the role of the BScN curriculum in providing exposure to CAN. In this respect, we collected and analysed quantitative data for our first and second aims and qualitative data for our third aim in a single nursing school in Jamaica. Our overarching mixed methods research question was: Do the qualitative findings validate nursing students' level of knowledge and attitudes to dealing with CAN?

Theoretical framework

Our assumption of the relationship between knowledge and attitude to CAN was based on the *knowledge-attitude-behaviour* theory put forward by Fabrigar, Petty, Smith and Crites (2006). They asserted that attitudes which are grounded on knowledge that is behaviourally relevant are more likely to predict behaviour better than when knowledge is of low - relevance. The *knowledge-attitude-behaviour* model is a continuous process of acquiring knowledge, producing attitudes and forming behaviours, which is applicable to nursing education (Xiong, Ding, Li, Pan, Li, and He 2020). In this regard, we expected that as knowledge of CAN increases, nursing students will have a more positive attitude to dealing with CAN which has implications for their clinical practice when the opportunity presents itself.

Design and methods

Study design

Prior research on nursing students' knowledge and attitudes to dealing with CAN uses quantitative methods of data collection. In this study, our goal is to get a comprehensive understanding of the topic in our context by using a convergent mixed methods research design. We selected this design to determine corroboration between data sets that can indicate consistencies and inconsistencies in the findings. Procedures for this study design are portrayed in Figure 1. Both qualitative and quantitative data were collected

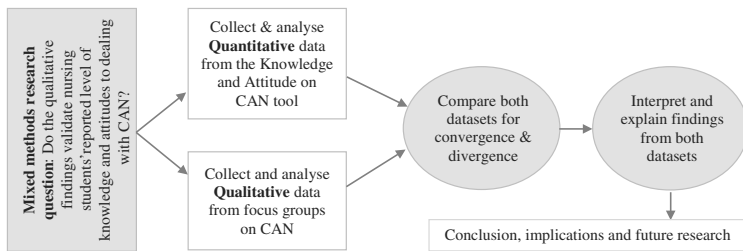


Figure 1: Convergent mixed methods research design procedures

simultaneously in the same phase (Creswell and Plano Clark 2018) where questionnaires provided quantitative data and focus group discussions provided qualitative data. We used a side-by-side comparison to compare both data sets to determine consistencies and/or inconsistencies and then sought an explanation for the findings in both data sets. Therefore, integration of both data sets occurred at several points in the research process which starts with our mixed methods research question, then data analysis, interpretation and explanation of findings (Creswell and Plano Clark 2011).

Instruments

Quantitative component

This study adopted a *Knowledge and attitude on child abuse and neglect* tool developed by Elarousy and colleagues (2012). The tool was modified for cultural sensitivity, for example, Saudi Arabia was changed to our local setting, 2 double-barrelled questions were separated and a repetitive question was excluded from among the knowledge questions. As such, knowledge was measured with 32 items under 3 sub-domains:

- Knowledge of risk factors, signs and symptoms of child abuse and neglect (17 items),

- Child abuse and neglect as a social problem (7 items), and
- Reporting of cases and national and international efforts (8 items).

Each knowledge item had three possible responses, either the statement is 'true', 'false' or 'unsure.' A score was assigned to the correct answer and 0 for any other answer with total scores ranging from 0 to 32.

Attitude to dealing with CAN was measured with 17 items on a 4-point scale with responses ranging from "strongly disagree" to "strongly agree." Responses were rated 0-strongly disagree and disagree and 1-agree and strongly agree, with total scores ranging from 0 to 17. Reliability was measured using Cronbach's alpha, and the coefficient for knowledge was .769 and .818 for attitudes. Prior studies that utilized the KACAN tool found similar levels of reliability for the attitude scale (e.g., Elarousy et al. 2012; Poreddi et al. 2016).

Qualitative component

We developed a focus group discussion guide specifically for this study that included open-ended questions on students':

- confidence in their ability to identify signs and symptoms of CAN,
- attitudes to dealing with CAN,
- exposure to CAN from courses (theory and practicum) in the curriculum, and
- recommendations for including CAN in the curriculum.

Throughout the discussions, we summarized participants' responses and asked them to validate the summaries.

Sampling procedures

Data were collected from a prominent university that is based in Kingston, Jamaica, offering a 4-year undergraduate BScN degree. We were interested in both males and females, 18 years and older, who were registered in the BScN programme to participate in the study. Year 1 students were excluded from the study because they are introduced to foundational courses at this stage of the programme and not yet immersed in nursing courses. With permission from the school to conduct the study, we received the sample frame of students from years 2, 3 and 4 in the BScN programme.

In the quantitative component of this study, we first stratified students by year group to calculate the number of students we needed for a representative sample. To aid in this process, we used the Raosoft sample size

calculator online with 95 percent confidence level and 5 percent margin of error. Sample size was calculated for each year group and to accommodate for non-response we added 10 students to each year group. Therefore, a total sample estimate was 294 across the 3 groups. In the second stage of sampling, we utilized a simple random sampling technique to select a sample from each year group using randomly generated numbers from Excel. We recruited participants via email and requested them to complete an online questionnaire in SurveyMethods. The average time to complete the questionnaire was 30 min.

For the qualitative component, we used a convenience sampling technique to select students from the 3 year groups of interest. We recruit students for the focus group discussions by their respective programme year. At the end of a lecture, we invite students to participate in the study. Krueger and Casey (2000) recommend 6 to 8 participants for a focus group to be able to manage the discussion. Therefore, our estimate sample size is 18 to 24 participants across 3 focus groups. Each focus group discussion takes approximately 45 min to 1 h.

Ethical considerations

Prior to collecting data for this study, we requested and received approval from the dean of the medical faculty and the head of the nursing school. We protected the rights of participants throughout the research process. For the survey, students were duly informed of the study via email that included a link to access the survey online. Participants were given the option to participate and/or withdraw at any time during the study without prejudice. By clicking on the link to continue to the online survey indicated that students read the consent information and agreed to participate. This online survey application generated participants' responses in Excel without identifiers such as email or IP addresses thereby protecting students' identity.

As for the focus group discussions, students were informed of the nature of study prior to the start of data collection. We received verbal consent from students to participate in the study and to record the sessions. Students were given the option to withdraw from the study at any time without prejudice. We also asked students to maintain confidentiality among themselves regarding all information discussed in the focus groups. Each focus group was audio-taped and later transcribed for analysis.

Responses from both quantitative and qualitative data were handled confidentially. No identifying information were requested during data collection. Therefore, we use numerical identifiers as we present

qualitative data in this report. There were no monetary or other reward for participation in this study.

Statistical analysis

We used SPSS, version 17 to analyse quantitative findings in this study. Descriptive statistics determined students' level of knowledge and attitudes to dealing with CAN. A linear regression model determined relationships between demographic variables and total knowledge scores. We summed and dichotomized attitude scores as low (0–8) and high (9–17) and treated attitude as an ordinal variable unlike prior studies that measured attitude as a continuous/ratio variable in their analyses (e.g., Elarousy et al. 2012; Poreddi et al. 2016). In this regard, to assess the relationship between knowledge and attitude, we used a logistic regression model. Statistical significance was assessed at $P < 0.05$.

For qualitative data, QDA Miner version 5 facilitated the analysis of the focus group discussions. We coded and developed themes that emanate organically from these data that coincided with quantitative findings. In this process, both researchers verbally agreed on the vignettes to be assigned to the themes that showed consistencies and/or inconsistencies with the quantitative findings.

Results

There were 312 students who completed the survey that predominantly consists of females (94.2%). The average age of participants was 22 ± 3.9 that range from 19 to 39 years old. Most students were in their final year of study (39.7%), followed by year 3 (34.6%) and year 2 students (25.7%). There were more students who identified as single (85.6%) than in a union (13.5%) or other (.9%). Of the participants, approximately 11% reported having at least 1 child and about $\frac{1}{3}$ indicated working with a child who experienced CAN (34.6%).

In addition, there were 21 female student nurses who volunteered for the focus group discussions. They were between the ages 18–26 years old. They were distributed by year groups that were approximately even across the groups for the discussions. All discussants reported participating in the online survey.

Knowledge of CAN

Findings indicate that on average, students have moderate to high knowledge of CAN (Table 1). Only 1.3% of all students correctly identify risk

Table 1: Description of students' knowledge of child abuse and neglect.

Knowledge of CAN	Mean	SD
Total knowledge of CAN (32 items)	23.22	± 4.33
• Risk factors, signs and symptoms of CAN	11.55	± 3.28
• CAN as a social problem	5.95	± 1.16
• National and international effort to CAN	5.71	± 1.36

$n = 312$

factors, signs and symptoms items, 36.5% correctly identify items on CAN as a social problem, and 7.7% correctly identify national and international efforts to CAN items.

In spite of students' average score on the risk factors, signs and symptoms sub-scale, most participants (84.9%) feel confident in their ability to identify risk factors and suspected cases of child abuse (83.9%) in the attitude to dealing with CAN scale (Table 2).

Table 2: Confidence in one's ability to identify risk factors and suspected cases of child abuse.

Item	Strongly Disagree		Strongly Agree	
	Disagree	Agree	Disagree	Agree
I am confident in my ability to identify risk factors of child abuse	1.0%	14.1%	58.3%	26.6%
I am confident in my ability to identify suspected cases of child abuse	2.6%	13.5%	61.5%	22.4%

$n = 312$

Yet, in the focus group discussions, students express their opinion that they are ill-prepared and are not confident in their abilities to identify risk factors or suspected cases of CAN. We find this across the three focus groups. For instance, a year 2 student states:

I'm coming from a family that doesn't have abuse, so encountering somebody experiencing abuse, I don't think I am equipped enough to talk to the person who is actually going through abuse, as a nursing student now. No, we're not equipped (participant #4).

Also, in the year 3 group, a participant adds:

So maybe in class, something came about a child (who has) been abuse and we say, oh! It's the responsibility of the nurse to report it once a child is being abuse. But it's

not really as if we get a topic about it to say, ok we're talking about child abuse, child neglect, and what's the procedure to go about it (participant #1).

As for year 4 students who are exposed to clinicals, a year 4 student from this group reports:

We don't know how to approach this. In the clinical area, we would need to know how to approach it. We're not learning how to approach child abuse in that I saw it in my field rotation and I really and truly don't know how to approach the situation (participant #1).

Furthermore, none of the demographic variables significantly relates to students' overall knowledge of CAN scores (Table 3).

Table 3: Liner regression- demographics on overall knowledge of child abuse and neglect.

	B	Std. Error	Beta	t	Sig.
(Constant)	23.44	2.817		8.322	000
Age	-0.001	0.07	-0.001	-0.018	0.986
Presence of children	0.066	0.86	0.005	0.077	0.939
BSCN programme (yrs. 2, 3, & 4)	-0.168	0.32	-0.031	-0.525	0.600
Experience working with CAN	0.027	0.532	0.003	0.051	0.959

n=312, p <.05

Attitude to dealing with CAN

Most participants score high on the attitude to dealing with CAN scale (78%) which indicates great confidence in their ability dealing with CAN. In a binomial logistic regression model (Table 4), findings show

Table 4. Binomial logistic regression- demographics on attitude to dealing with child abuse and neglect.

	B	Std. Error	Wald	Sig.	Exp(B)
Age	0.109	0.081	1.797	0.180	1.115
Presence of children	0.717	0.651	1.212	0.271	2.048
BSCN programme year 2 (ref)			7.448	0.024	
• Programme year 3	-1.191	0.437	7.432	0.006	0.304
• Programme year 4	-0.839	0.419	4.011	0.045	0.432
Experience working with CAN	0.611	0.329	3.446	0.063	1.841
(Constant)	-0.599	1.731	0.12	0.729	0.549

n = 312, p<.05

programme year as a significant predictor of attitude to dealing with CAN. In that, year 3 students are less likely than year 2 students to score high on the attitude to dealing with CAN scale. Similarly, findings show that year 2 students are more likely to score higher on the attitude to dealing with CAN scale than year 4 students although the relationship is weak.

Yet, there is no clear indication of a qualitative difference among the year groups and dealing with CAN. Students seem to be quite positive in dealing with CAN but at the same time express a sense of anxiety in their responses as they prepare for real-world experiences as registered nurses, despite their programme year. For instance, a year 2 student states:

I am very passionate about it (child abuse and neglect), probably because I am trying to deal with my negativity being a person who has been in verbal abuse, sexual abuse, you name it. As a student nurse with a nursing career, how are we going to deal with this ... You would want to help somebody out there in that situation, experiencing abuse (participant #1).

In the year 3 group, a participant adds:

So, if I'm suppose to get in contact with a child in the practical in the clinical setting, who has been abused, all I know to do is go to, maybe the nurse, and say, ok I think this child is being abused. I don't know what to say to that child. I don't know how to do anything, I don't know how to intervene ... I feel bad about it because for me to start working a year from now, because we are third-year students (participant #5).

Among the year 4 participants, a student reports:

I think those courses (paediatrics and community health) would be good to integrate it (CAN) and integrating that is very important seeing that it is just a great issue in our society... so that when we go out there we know what to do (participant #4).

Knowledge and attitude to dealing with CAN

When we regress knowledge of CAN on attitude to dealing with CAN, findings show no significant relationship, in that, increases in knowledge do not predict greater scores on the attitude scale.

Gaps in the BScN curriculum

From the survey data, approximately 75% of 312 respondents indicate receiving information on CAN of which about 1/3 report courses as a source of information on CAN (Figure 1, multiple responses are allowed).

From the focus group discussions however, students express that information they receive on CAN is not from the 4 paediatric courses

in the BScN curriculum (theory & practical) which include a module on parent-child. Rather, they gain CAN knowledge and experience from 2 other courses in the curriculum. These are community health and mental health practical courses which are taught only in years 3 and 4. They note that CAN is not the primary focus of these courses. Students also report that they receive knowledge on CAN from other courses prior to attending university. In addition, some participants state that they have personal encounters with CAN which help in their understanding in this area. As such, their responses indicate that their exposure to CAN is based on vicarious learning in the practicum and personal encounters. For instance, a year 2 student states, "From my personal reading as well as I'm individual who has been abused myself. It can be identified in another individual in an abusive state or has been abused, you can identify them just by seeing the attitude" (participant #1).

In the year 3 group, a participant talks about her experience in one of the courses in the BScN programme, "In community health we briefly touched on it (CAN) when she taught us to identify signs of abuse" (participant #2).

A student from the year 4 group of participants reports:

In the society that we grow in, child abuse is very common. I'm sure each of us has somebody in our community or families who have experienced that, so we are kinda (somewhat) aware of child abuse from early. But in primary school it was emphasized so we basically know about it from then (participant #5).

Another year 4 student shares her experience about the courses in the programme; she said, "What they talked about mostly (in the paediatric courses) was about mostly domestic abuse, but in terms of child abuse, no" (participant #2).

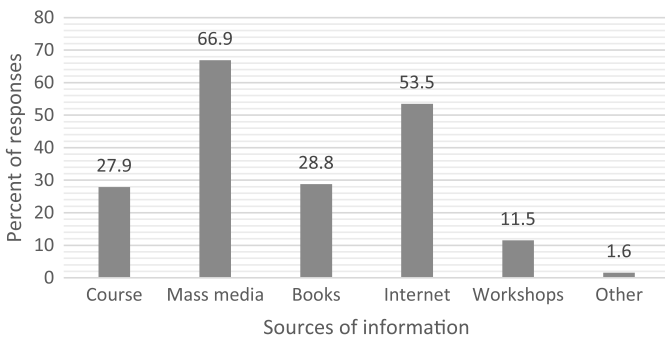


Figure 2: Student nurses' sources of information about child abuse and neglect

Recommendations for curriculum change

Participants from the focus group discussions are very enthusiastic to receive training on CAN and put forward several recommendations for including formal training in the BScN curriculum. They make a case for CAN training prior to practicum proposing that CAN should be taught in year 2 of the BScN. A year 2 student states:

Best we learn it before (we) go into the practicum ... so, before we go on the ward, teach us some of the foundations that we get fi (to) interact with the person, don't wait until third year. By third year we already have certain things in a yuh (in your) head (participant #6).

Participants also suggest that formal education on CAN ought to be taught in both theory and practicum. For theory-based learning, they suggest in-course presentations. For instance, a year 2 student states, "We put on a play to carry out the various points on child abuse and what to look out for, and what it is" (participant #1). Another year 2 student adds, "It is the Child Development Agency that deals with abuse, we can have a partnership with them to have seminars (participant #5).

Participants also put forward that the school can disseminate knowledge and skills on CAN via workshops. A year 2 student says, "In workshops, just like how they give us health promotion, in the materials, give us scenarios – what would you do and why would you do that, with a checklist or something" (participant #5). A year 3 student adds, "We do workshops all the time, so we could have like a child abuse awareness day or something like that where we present" (participant #2).

For practicum-based learning, a year 3 student recommends hands-on experience with children. She reports, "A part of the practicum could be that we visit children's home to observe. Or, if they have anywhere else where children who have been abused, we could visit those areas to learn how to intervene" (participant #6). Another year 3 student takes a more subtle approach to the practical and reports:

Because we don't want to go out and ask certain questions and it's too sensitive and then we cause chaos. So, I would prefer to have like a mini lab session, not too long, where we have like a little tool and we go through it and we practice on each other (participant #2).

Participants conclude that the topic of CAN could be taught within modules in existing courses in the programme so the curriculum credits are not unduly extended.

Discussion

CAN is found in Jamaica's society with sufficient regularity to require professionals to be appropriately trained to identify and respond appropriately to CAN incidences. Jamaican nurses have a legal and ethical responsibility to protect children through prevention, detection and response to CAN. Therefore, student nurses must be given the opportunity to gain knowledge and experience with CAN through the school's curriculum to carry out this mandate when they graduate from the BScN.

In this study, findings indicate that nursing students' scores on the overall knowledge of CAN are greater than those that are reported in previous studies (e.g., Poreddi et al. 2016; Elarousy et al. 2012). While participants are very confident in their ability to identify risk factors and suspected cases of child abuse items and have moderate to high scores on the knowledge tool, they report feelings of ill-preparedness in their abilities to identify risk factors or suspected cases of CAN. Their personal encounters with CAN and experiences of their colleagues may explain this level of confidence but are not limited by them. CAN signs and symptoms are easy to miss if nurses are unprepared to identify them. Nurses will need to make the differential diagnosis which then opens the appropriate line of treatment for their clients; therefore, it becomes vital for them to have this knowledge before they enter the clinical areas.

Further, while previous studies find that completing a course that covers CAN (Elarousy et al. 2012; Ozbey et al. 2018) and final year students (Poreddi et al. 2016) significantly increase nursing students' knowledge of CAN, these factors are not significant in this study. This may be explained by the nature of curriculum in this school's nursing programme which seems to cover a broad range of nursing conditions and not specifically CAN. Therefore, year of enrolment would not make a significant difference in one's knowledge of CAN. Also, participants report in the discussions that the courses they took on CAN are not of this school's nursing curriculum so one would not expect differences in knowledge according to year of enrolment in this study.

Consistent with previous studies, participants have positive attitudes towards dealing with CAN (Poreddi et al. 2016; Elarousy et al. 2012). This may also be owing to participants' personal encounters with CAN who feel the need to protect others from abuse and neglect they themselves experience in childhood. This assertion is supported by students' reports in the qualitative data of this study.

In addition, there is no evidence in this study to indicate that older students have a more positive overall attitude to dealing with CAN than their

younger counterparts as indicated in prior research (e.g., Elarousy et al. 2012; DeMattei et al. 2009; Poreddi et al. 2016). Jamaica has a robust public awareness campaign on CAN that impacts the population, and this may have an influence on people irrespective of age that may help to explain this finding. Also, given the prevalence of CAN in the society, it is perhaps inevitable that they would have some contact with this phenomenon during their normal daily lives.

We find that participants did not have a formal course on CAN in this school's nursing programme. Although there are courses in the curriculum that indicate areas where CAN are taught, this is not the case. Therefore, one would not expect changes in attitudes to dealing with CAN according to year of enrolment. Their positive attitude may be reflective of their experiences, exposure to robust CAN government programmes and institutions that deal with this societal problem. For instance, the CPFSA raises awareness about CAN, child rights and parenting via community outreach and public education which seem to have a broad reach (Government of Jamaica 2021).

Also, there is evidence in the literature to show that final year nursing students had a more positive attitude to dealing with CAN than students in lower levels of the programme (Elarousy et al. 2012; Poreddi et al. 2016). However, in this study, quantitative findings suggest that year 2 nursing students are more likely to have a positive attitude to dealing with CAN than nursing students in years 3 and 4. This may be because year 2 nursing students are required to go into communities as part of their practicum and so are more likely to get exposure to CAN. Here, nursing students have the support of registered nurses who structure their learning in the field to include situational issues like CAN even though they are not mandated by the objectives in the curriculum. Most CAN cases that are seen in the public health care system would present in community health clinics and not necessarily in the secondary care facilities like hospitals. As nursing students advance to years 3 and 4, they would spend more time in the hospital and work with adult patients while being trained to manage a ward. Therefore, their focus would change as they advance in the programme which could perhaps explain this difference. Conversely, there is no qualitative indication of differences among the year groups as participants all seem to have a positive attitude to dealing with CAN. To note, the sample size for the focus groups is considerably smaller than the survey; therefore, it would be difficult to identify differences among the year groups in such a small sample. Also, the similar attitude to dealing with CAN among the different year groups may be

owing to a self-selection for the focus group among nursing students who had personal encounters with CAN or experiences of their colleagues.

The role of a curriculum is to structure knowledge so that it leads to appropriate attitudes and behaviours in a young nurse professional. Findings from this study do not support the *knowledge-attitude-behaviour* theory in that students' knowledge of CAN is not significantly associated with their attitude to CAN. We made the knowledge-attitude link as we initially assume from the curriculum that the 4 paediatric courses (theory & practical) during years 3 and 4 include aspects of CAN in the parent-child module, however, this is not the case. In fact, students obtain knowledge and experiences in CAN vicariously. This means that there is a substantial gap in the school's curriculum in terms of providing knowledge and skills to deal with CAN and so, the knowledge that students acquire vicariously in their clinical settings has no formal structure to allow them to develop appropriate attitudes to dealing with CAN. This assumption is supported by Feng and Levine (2005) who find that insufficient training is a major barrier to nurses' intention to report CAN and reporting behaviour as participants have feelings of uncertainty about the evidence in suspected CAN cases.

What is interesting is that about 60% of students from the Saudi Arabian study complete at least one course that covers topics on CAN, but the researchers also find no significant relationship between knowledge and attitude to CAN (Elarousy et al. 2012). The theory suggests that knowledge must be behaviourally relevant and continuous for changes in attitude and behaviour and if knowledge of CAN has low relevance to students at their stage of the programme, then this may be a possible reason for their findings. Therefore, curriculum developers need to consider the relationship between knowledge, attitude and behaviour and their relevance to each other when including formal education on CAN in their programme.

Implications for child protection

If the BScN curriculum insufficiently prepares nursing students to address CAN when they become registered nurses, then they are unable to protect children through prevention, detection and response to CAN. Therefore, the implications may be that:

1. a child who experiences abuse and neglect does not get appropriate health care,
2. nurses will not be fulfilling the mandate to ensure that all CAN cases are reported to the relevant authorities, and

3. CAN statistics that we depend on to make public health decisions may not be an accurate account.

Conclusion and the way forward

By utilizing an MMR approach, contrasting findings between the quantitative and qualitative data are identified. While the quantitative data suggest that the existing curriculum provides the necessary support for these nursing students' knowledge and attitude to dealing with CAN, the qualitative data suggest deficiencies in their knowledge, attitude and application in clinical practice. In addition, qualitative findings suggest that their exposure to CAN is through vicarious learning and not the courses which indicate a gap in the school's BScN curriculum. Furthermore, by using an MMR approach, participants contribute valuable recommendations to amend the curriculum so that going forward nursing students would benefit from additional knowledge and skills relating to CAN.

We therefore recommend that curriculum reviewers examine and identify appropriate courses in years 2, 3, and 4 of the schools' BScN curriculum to insert course objectives that would reinforce students' theoretical and practical experience on CAN. Using course objectives can meet these students' learning needs without extending the curriculum credits which are already at a maximum for a BScN programme. In this school, and institutions that utilize its franchised BScN curriculum, we suggest CAN objectives be inserted in the following courses:

- Year 2 – signs and symptoms of CAN within the health promotion course
- Year 3 – exposure to CAN cases within the community health nursing clinical practicum
- Year 4 – legal aspects of CAN (e.g., 1hr workshop by CDA/CSOCA) within the paediatric course or nursing care of children and adolescents course.

This inclusion will allow for sequencing in the curriculum where objectives from a lower-level build towards final year, strengthening students' knowledge and attitudes to deal with CAN.

Furthermore, based on study findings, researchers may consider repeating this study in other schools of nursing that uses a different BScN curriculum. This is important because all schools of nursing in the Caribbean region utilizes a similar blueprint for their curriculum development, but their curriculum may vary in content based on the school's perceived understanding of societal needs. Researchers can also

consider evaluating registered nurses' knowledge and attitudes to deal with CAN which will give an indication as to whether professional experience and continuing education are compensating for the lack of inclusion of CAN in the BScN curriculum.

Limitation of the study

While this study focused on one institution, the results may be extrapolated to the other 6 institutions that use the same BScN nursing curriculum.

Conflict of Interest

The authors declare that the research is conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Exploring Classroom Climate and Students' Views on Physical Chemistry at the UWI – A Mixed Methods Approach

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Abstract

Introductory physical chemistry lays an important foundation for many courses within the Faculties of Science and Technology at the University of the West Indies (UWI), and further, in the general advancement of science globally. Unfortunately, for many years some of the campuses record high failure rates which sparked an interest in investigating the perceptions of students towards introductory physical chemistry and the physical chemistry classroom climate at the UWI, as a precursor to developing tools to better facilitate students' understanding in this subject matter. Hence, in this mixed methods research study, we examined the perceptions of first-year chemistry students towards introductory physical chemistry and the appropriateness of instructors' teaching of the content, at three campuses of the UWI – Cave Hill, St. Augustine and Mona Campuses. We analysed the perceptions of 474 students with the use of a perceptions survey (Quantitative Phase), conducted interviews with 46 students and observed the classroom climates (Qualitative Phase). A statistically significant difference in students' perception towards physical chemistry and the appropriateness of teaching methods utilized emerged based on the campus study. In addition, it was found that there was a positive relationship between the appropriateness of methods used and the perception towards physical chemistry at each campus. Within the qualitative phase, the key themes from the study were: physical chemistry is conceptually difficult, mathematically intensive, and abstract and linked to the teaching strategies used by the instructor. Additionally, classroom climates varied from campus to campus and were linked to instructor disposition, student disposition and the teaching strategies utilized. The data strands were integrated

with the use of (i) MAXQDA, where a mixed research matrix was generated to compare code frequency data (quantitative) to themes (qualitative) and (ii) a joint display to compare quantitative and qualitative data in a side-by-side manner. Based on the findings of the study, implications and recommendations for practice and future research are discussed for high school and college freshman educators, college advisors in STEM education, educational leaders and policy makers.

Introduction

For many years, students at the University of the West Indies have shared stories about their struggles with physical chemistry and at the examination level, and this is evidenced by relatively high failure rates. Physical chemistry facilitates the growth of chemistry as a body of knowledge, by forming a theoretical foundation for many principles in the chemistry discipline. Furthermore, aspects of physical chemistry are vital to the curricula in other sciences such as physics (Meltzer 2004), biology (Fisher and Arnold 2000), biochemistry (Anderson and Schonborn 2008) and engineering (Foroushani 2018; Streveler et al. 2013). As chemistry educators, we are deeply interested in facilitating an effective teaching and learning process, especially within physical chemistry.

Many research studies in physical chemistry education consider the factors that influence the conceptual difficulties associated with the learning and teaching of the discipline and suggest how to alleviate them (Bain et al. 2014; Mulop et al. 2012; Schwedler and Kaldewey 2020). In general, the literature indicates that students struggle with physical chemistry due to the abstract and complex concepts and processes involved. Physical chemistry concepts rely heavily on the symbolic level and require teaching strategies which provide students with the opportunity to manipulate and apply equations and diagrams (Schwedler and Kaldewey 2020) through exploiting their mental modeling skills. While grappling with these skills, students create barriers to the learning process making it difficult for them gain a thorough understanding of the subject matter (Tsaparlis 2007). In addition, for students to be successful within physical chemistry they must have strong mathematical skills (Barrante 2016; Cole and Shepherd 2019). Some studies describe the move from teacher-centred pedagogical strategies to those which involve constructive interdependence amongst students and context rich instruction accompanied by the inclusion of technological resources (Sözbilir 2004, Tsaparlis 2007). For instance, Schwedler and Kaldewey (2020) conducted a study investigating students' response to a physical chemistry class using a simulation based learning environment. The class required the student to assess their

own mental models of abstract physical chemistry concepts connecting them to equations and diagrams on the symbolic level. They found that students enjoyed the learning process, and were cognitively engaged and demonstrated strengthened conceptual understanding (Schwedler and Kaldewey 2020). In addition, it increased student interest and autonomy as it was reported that many students chose to work on their abstraction ability in their free time (Schwedler and Kaldewey 2020).

Although alleviating difficulties in physical chemistry is a relatively popular and current research area, most of these studies are quantitative in nature and therefore, forfeit the opportunity for gathering rich perspectives from student views. Content of any course is perceived differently from student to student based on their experience (previous or current classroom environment and instruction), knowledge, understanding, goals and interests. These perceptions will influence their motivation and interest in the course, and thus have the potential to affect their learning. In addition, this type of research is limited within our region of small island developing states. Even though it has not been documented by published research, students do have problems grasping physical chemistry within the Caribbean. Hence, the objective of this study was to investigate students' perceptions associated with physical chemistry as a precursor to unearthing measures to alleviate or reduce the impact of conceptual difficulties at the University of the West Indies.

Methodological Framework

The decisions made within this study were guided by the 13-step process which was conceptualized by Collins et al. (2006). This mixed methodological framework, displayed in Figure 1, involves three distinct stages which influence each other and are recursive (Collins et al. 2006). The 13 steps within this process are divided into three stages – formulation, planning and implementation, and are tasked with guiding and enhancing the methodological rigor of the research (Leech et al. 2011), thereby enhancing the quality of the inferences drawn from the qualitative and quantitative data strands of this research.

Step 1: Mixed Goal of the Study

When conducting any study, thoughtful consideration should be given to the goals of the research, since they aid the researcher in identifying the best methods to use when answering research questions (Newman et al.

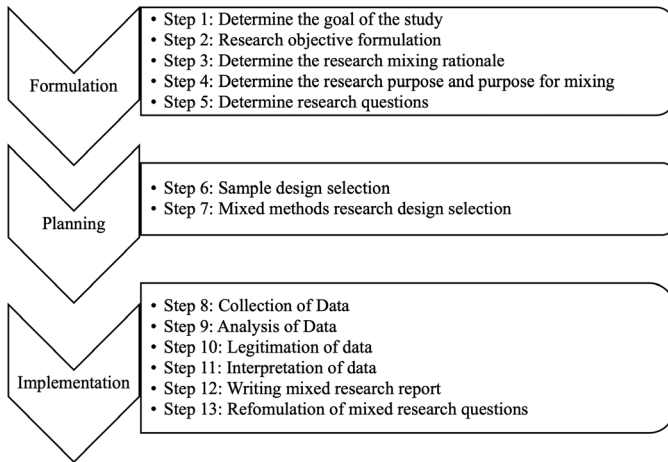


Figure 1: 13-Step Methodological Framework. Adapted from Collins, Onwuegbuzie and Sutton (2006)

2003). The typology which guided the identification of the goals was that of Newman et al. (2003). This typology suggested nine goals which can be considered to govern any research study. There are (a) to predict, (b) to add to the knowledge base, (c) to impact in a multi-faceted way, (d) to measure the change, (e) to understand complex phenomena, (f) to test new ideas, (g) to beget new ideas, (h) to inform constituencies and (i) to examine the past (Newman et al. 2003). The goal of this study was to examine the perceptions of first-year chemistry students towards introductory physical chemistry and to examine the appropriateness of instructors' teaching of physical chemistry at three campuses of the UWI – Cave Hill, St. Augustine and Mona Campuses. There is a paucity of research within the Caribbean context available to tertiary education leaders and practitioners to improve the quality of teaching and learning at our institutions. Consequently, the major goals of this study were to contribute to the knowledge base, have a multi-faceted impact and understand complex phenomena.

Step 2: Mixed Research Objective

The Johnson and Christensen (2012) typology was utilized to determine the research objectives. The five major ones are exploration, description, explanation, prediction and influence (Johnson and Christensen 2012). Of these objectives, exploration, description and explanation were pertinent to this study. Through exploration, the study sought to describe the attributes and nuances of the phenomenon under investigation and to

provide explanations for the way in which the phenomenon under study exists.

Steps 3 & 4: Purpose of Study, Purpose of Using the Mixed Methods and Rationale for Mixing the Data Strands

Much work has been carried out in Turkish, Irish, European and American contexts, for the student perceptions associated with physical chemistry, however, there is a scarcity of research within the Caribbean context. The Caribbean setting is culturally diverse in itself and further, is made up of small island developing states. The potential for scientific advancement in a country is intrinsically linked to the socioeconomic stability of that country and thus influences the accessibility of resources to that country. Smaller developing countries almost by definition have less available resources (educational, population, finances and so on) which can make it challenging to produce qualified and competent students that can compete internationally. Therefore, it may be insufficient to assume that the problems and solutions unearthed in developed contexts can service our Caribbean context. Thus, our unique setting should be explored, and context-appropriate solutions provided.

Moreover, the studies conducted in these contexts were mostly quantitative, with a few qualitative in nature and thus, there is a dearth in the number of studies which use the mixed methodology. Unlike purely qualitative and quantitative methodologies, we expect that the use of a mixed methods approach will provide the latitude, through an integration of both data types, for the qualitative findings to help assess the validity of and provide explanations for the quantitative findings. A mixed methods approach was deemed to be the most appropriate way to elicit a holistic view of first year students' perceptions towards physical chemistry, how it is influenced by the teaching methods, teacher disposition and its impact on the learning environment. It is hoped that the implications and recommendations derived from the findings of this study would be useful for high school and college freshman educators, college advisors in STEM education, educational leaders and policy makers, regionally and globally.

Greene et al. (2001) posited four purposes for the use of mixed methods research designs drawn from the works of Cook (1985) and Greene et al. (1989). These four purposes were: (a) enhanced validity and credibility of inferences – using the qualitative and quantitative data to measure the

same phenomenon with the intent to examine convergence, (b) greater comprehensiveness of findings – using both data strands to offer different perspectives of the phenomena under study, (c) more insightful understandings – using different methods to uncover conflicting or diverging view and (d) increased value consciousness and diversity – to advance different values/interests which invites dialogue about diverse perspectives on important public issues. Hence, the threefold purpose of this study was to enhance validity and credibility of the inferences made, facilitate comprehensiveness of the findings and to gather more insightful understandings of the phenomena under study.

Moreover, the rationale for mixing the quantitative and qualitative strands was to facilitate participant enrichment and significance enhancement (Collins et al. 2006). Participant enhancement occurred by using students who participated in the quantitative phase for the qualitative phase and through qualitative and quantitative data collection, analysis and interpretation, significance enhancement was achieved (Geertz 1973), resulting in the yield of thick and rich data (Geertz 1973).

Step 5: Research Questions

The Clark and Badiie (2010) typology suggests that a study should be furnished with least one mixed methods question, accompanied by qualitative and quantitative research questions. Hence, the following research questions were addressed in this mixed methods study:

Quantitative Research Questions

1. What are the general perceptions of first-year physical chemistry students towards physical chemistry content and the appropriateness of the teaching methods utilized at the UWI?
2. Is there any significant difference in students' perceptions towards physical chemistry and their perceptions towards the appropriateness of teaching methods based on the campus of study?
3. Is there any significant difference between student perception towards physical chemistry content and their perceptions towards the appropriateness of teaching methods based on the campus of study?

Qualitative Research Questions

4. What views do first year physical chemistry students hold towards physical chemistry at the UWI?

5. In what way does the learning environment at the UWI facilitate the teaching and learning of physical chemistry concepts?

Mixed Methods Research Question

6. To what extent do student views on physical chemistry explain the general perceptions of first year students towards physical chemistry at UWI?

Theoretical Framework

This mixed methods study was informed by the use of Bruner's constructivist theory. This theory propounds that learning is a process in which the learner actively constructs ideas or concepts based on their previous or current knowledge (Bruner 1966). Similar to Piaget (1959), Bruner believed that intellectual ability develops in stages through step-by-step changes within the mind, which he called inactive, iconic and symbolic representations of knowledge (Bruner 1960), that is, from concrete to more abstract representations. In addition, he also accepted the Vygotskian view of the importance of social interaction while learning (Mayer 2008; Vygotsky 1980, 1986). However, a rather salient characteristic of learning abstract physical chemistry concepts is that of reflection and introspection in which Bruner's theory omits. Thus, we turned to Dewey, who made up for this shortcoming with his educational perspective, in which he asserted that while there is an importance in active learning, the active experience was not enough for a student to create meaning (Dewey 1986). He believed meaning could only be attained if the students engaged in reflection, where they form continuities between the experiences and the knowledge obtained (Dewey 1933; Taber 2006). Added to this, Carl Rogers argued that reflection allows students who are in a state of confusion or disequilibrium to resolve, understand and accommodate new information, bringing a harmonious cognitive state to the learner (Rogers 1969; Osborne and Wittrock 1983; Osborne et al. 1983). Here, Rogers builds upon the view of Piaget, Vygotsky and Bruner, and it can be said that physical chemistry students should engage in some level of introspection when grappling with disequilibrium brought on due to learning a new or confusing topic. Therefore, the learning experience is most effective when students are provided with an active environment which encourages students to use techniques such as experimentation and real-word problem-solving scenarios (Taber 2006) to create knowledge and reflect on and talk about what they are doing how their

understanding is adapting with time (Akpan and Kennedy 2020). Added to this, the environment facilitates student engagement, collaboration and understanding. This way students can construct meaning from self- and peer-regulated new knowledge (Bruner 1966) as a result of sharing their views and consolidating their thinking in a safe space accompanied by their peers (Dewey 1933; Mayer 2008; Bruner 1960).

Bruner (1966) spoke to four aspects of his theory of instruction which encompassed (1) learners' predisposition to the learning process, (2) the organization of the knowledge such that it can be easily grasped by the learner, (3) presenting the material in the most effective sequence and (4) the mode of delivery. These features guided the study's benchmark for instruction and were well in-line with the Honebein (1996) pedagogical goals of constructivist learning environment drawn from Cunningham et al. (1993) and Knuth and Cunningham (1993). Within a physical chemistry classroom, it is important for the instructor to establish and present the course content in a logical sequence – progressing from concrete to abstract. In addition, this sequence should be known to the students (course objectives). Students should also be provided with the material before class, to facilitate any student who values reading ahead, and be readily accessible after class, to provide the opportunity for any student who was unable to view the notes before class or unable to take notes in class. Students can then listen during the class and refer to the notes later, if necessary. Further, if a student is struggling with a particular part of the course, they would be able to review the notes in an order which best suits their learning needs. As it relates to mode of delivery, face to face classes should be conducted in way to include opportunities for collaboration embedded within a supportive context-rich environment (Taber 2006). This would aid student engagement and enhanced learning.

Further, from a constructivist perspective, effective teaching requires that the learner be responsible for his or her learning and is accountable for the learning that takes place (Murphy 1997). Tam (2000) argues that the role of the instructor in a constructivist learning environment is to facilitate the construction of knowledge in a collaborative classroom. Therefore, once the lecturer provides the course information in a palatable way, facilitates a supportive environment, in accordance with Bruner's theory, and encourages deep thinking and reflection (Dewey 1933; Rogers 1969; Osborne and Wittrock 1983), the students are then responsible for demonstrating a sound conceptual understanding and mastery of the material (Taber 2006). Once this synergy is maintained we expect the classroom learning environment would be a positive and effective one.

Methodology

Contexts of the Campuses of Study

In general, the chemistry degree programme offered at Mona, St. Augustine and Cave Hill is a 3-year programme with an added preliminary year if students have not completed the Caribbean Advanced Proficiency Examination (CAPE) or the equivalent to the freshman year in a 4-year degree programme. The major difference between the campuses at the matriculation stage is that in addition to CAPE chemistry, Mona and St. Augustine students are required to matriculate with CAPE mathematics. If students have not fulfilled this requirement, they are required to take first year mathematics (Mona) or preliminary mathematics (St. Augustine). On the other hand, matriculants at the Cave Hill campus are only required to have successfully complete CAPE chemistry. Hence, Mona and St. Augustine students are armed with previous experience with the applicable math (calculus) during their study of physical chemistry while at Cave Hill many students matriculate without a previous experience in calculus.

The physical chemistry first-year chemistry course at Mona has a normal roll of 500–600 students, while St. Augustine and Cave Hill have rolls which vary between 120–150 students and 60–90 students, respectively. It should be noted that the number of students enrolled at each campus vary based on the relative sizes of the campuses. Since, first-year chemistry is a foundational content area for many other degree programs within their respective Faculties of Science and Technology many of the students enrolled in first-year physical chemistry may not graduate with a chemistry degree but rather with majors such as biochemistry, physics, engineering and environmental science, ecology and biology.

Step 6: Mixed Sampling Design

Overall, the sampling design utilized was that of nested sampling (Onwuegbuzie and Collins 2007). There was a concurrent collection of both qualitative and quantitative data where the qualitative participants were a subset of the quantitative participants. All students had the freedom to choose whether they wanted to participate in the study. The target population at each campus was the first-year physical chemistry students. Convenient sampling was utilized for the quantitative strand since only those who were present in the classes on the days of the survey distribution would have participated in the study. While the qualitative strand of the study also involved the use of convenient sampling from the participants of the quantitative phase to participate in the interviewing process.

Table 1: Demographics of the participants for this mixed methods study.

Demographic		Campus of Study		
		Mona (N=320)	St. Augustine (N=90)	Cave Hill (N=64)
Sex	Female	220	66	52
	Male	99	24	12
	Missing	1	0	0
Age (years)	16-20	269	68	60
	21-25	47	19	4
	26-30	4	2	0
	31-40	0	1	0
Previous Mathematics Experience (Post-CSEC)	Yes	320	90	32
	No	0	0	32

Participants

For the quantitative phase, a total of 474 students completed the perceptions survey. Of these 474 participants, 64 students were from Cave Hill, 90 students from St. Augustine and 320 from Mona. The demographics of the participants are included in Table 1. For the qualitative phase, a total of 46 interviewees participated, 23 students were from Cave Hill, 14 students from St. Augustine and 9 students from Mona. Notably, the researchers were based at the Cave Hill campus and therefore, we believe that familiarity played a role in the larger number of interview participants as students were more comfortable. According to Creswell (1998) and Moser and Korstjens (2018) samples sizes for phenomenological studies should be fewer than 10 participants to ensure that deep, case-oriented analysis can take place. However, larger numbers are acceptable especially in cases where complementarity is important, whereby capturing as many categories and patterns is an important criterion of the study (Moser and Korstjens 2018). Hence, avoiding informational redundancy and data and theoretical saturation (Sandelowski 1995).

Reflexivity

Author 1, the principal investigator and observer within this research study, is a chemistry teacher with a deep interest in the teaching and learning process within physical chemistry.

Author 2 is a chemistry teacher with an interest in understanding the factors that affect how students learn and how teachers teach Science.

With a love for Physical Chemistry as a student and having had the opportunity to teach it in summer periods, there is a desire to understand why some students express difficulty with the sub-discipline.

NB: None of the authors were directly engaged in the teaching of Physical Chemistry during the period of study.

Step 7: Mixed Research Design

This study was carried out with the use of a fully mixed concurrent equal status design. This involved the mixing of the qualitative and quantitative strands across the objective, data collection and analysis and the inferences made (Leech and Onwuegbuzie 2007). Further, both qualitative and quantitative phases occurred at the same point with the data strands given the same level of priority when answering the mixed research question (Leech and Onwuegbuzie 2007). The quantitative phase utilized a descriptive-correlational research design which answered research questions 1–3, while the qualitative phase was carried out through a phenomenological design which aimed to answer research questions 4 and 5. This qualitative research tradition seeks, through immersion, to discover and describe the different ways in which people conceptualize, understand, realize and experience varying phenomena in the world (Marton 1981, 1986). Since the researchers are immersed in the study, they not only report on the empirical findings; what is observed and the participants' responses to those observations but use their own experience within the study to shed light on alternative viewpoints (Marton 1986). The research philosophy adopted was that of a dialectical pluralist stance, where multiple epistemological perspectives were included within the same inquiry (Johnson 2012, 2017). These two epistemological perspectives are postpositivism (Phillips et al. 2000) and constructivism (Bodner 1986; Murphy 1997; Bruner 1966). Lastly, the mixed phase answered question 6.

Step 8: Mixed Data Collection

Instrumentation

This mixed methods study utilized a perceptions questionnaire (quantitative), an interview protocol (qualitative) and an observation protocol (qualitative) within the data collection phases. The perceptions questionnaire was a 31-item, 4-point Likert-format instrument (Cronbach's $\alpha = 0.926$) that was administered to the student participants in the quantitative phase for this mixed methods research study. The survey, adapted from Charles (2014), was split into two sections in which

questions 1–24 focussed on student perceptions towards physical chemistry (Cronbach's $\alpha = 0.91$) and questions 25–31 focussed on the appropriateness of teaching methods for physical chemistry (Cronbach's $\alpha = 0.88$). Of these 31 items, 20 were scored normally while 11 represented reverse-scored items. Table 2 provides sample items from the students' perceptions questionnaire.

The interviews were carried out in a private, one-on-one setting, to probe students' dispositions, perceptions and experiences as it relates to physical chemistry and how it is taught. The interview protocol included questions such as:

- How do you feel about physical chemistry?
- Take me through what happens in a regular class. The lecturer walks in, and what happens after that?
- What do you find the most difficult about physical chemistry?

The researcher-designed and pre-piloted observation protocol was purposed with revealing elements of the classroom experience, that act as unbiased mediating information as well as adding any additional information that may be missed from interviews. The observation protocol included the following categories: lesson structure, teacher and student interaction, instructional strategies, presentation and topic content.

Table 2: Sample items from the students' perceptions questionnaire.

Sub-scale	Item no	Type of Item	Sample Question
Student perception towards physical chemistry	9	Positive Item	I look forward to Physical Chemistry lectures.
	7	Negative Item (reverse-scored)	Physical Chemistry usually makes me feel uncomfortable and nervous.
Appropriateness of teaching methods	30	Positive Item	During physical chemistry the lecturer helps us break the problem down into small steps to make problem solving more manageable
	24	Negative Item (reverse-scored)	During physical chemistry the lecturer rushes through the topic without giving us time to think through or think about the steps we are learning

Procedure

Permission was sought and granted by the UWI's Institutional Research Board (IRB), responsible for promoting an international standard of ethics, to conduct this research. Consent was then obtained from each campus and all participants and the procedure was carried out as outlined in Figure 2. With the permission of the lecturer, classroom observations were carried out on all first-year physical chemistry thermodynamics classes. One topic was chosen for classroom observations due to (1) the

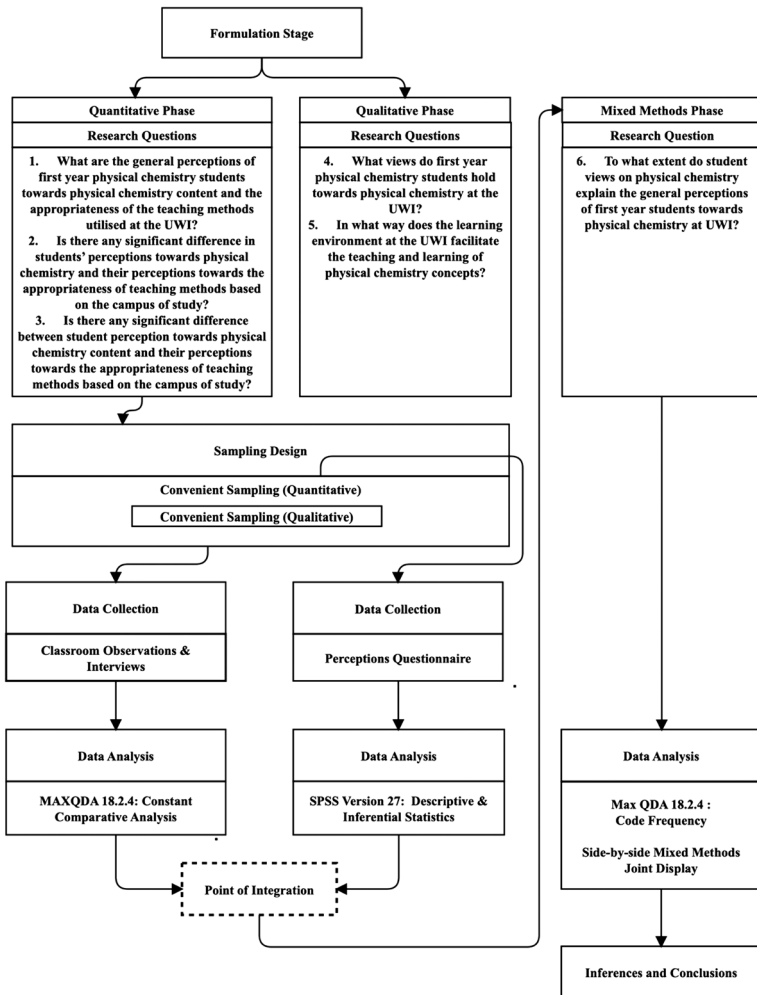


Figure 2: Mixed Methods Implementation Diagram

limited time (3-week period) that the researcher could be away from campus and (2) the first-year physical chemistry courses at all campuses are taught in the same semester.

At Cave Hill, two researchers carried out independent observations of the classroom environment, simultaneously, where they were strategically placed for optimal observation of the classroom environment, whilst audio-recording for later transcription. While at St. Augustine and Mona, only one researcher participated in the data collection phase due to financial, time and travel restraints. However, these classes were audio recorded and later transcribed.

Concurrent to the collection of classroom observation data, 474 students in total agreed to complete the perceptions survey (quantitative phase). Upon completion, students who volunteered for the qualitative phases were asked to participate in the semi-structured interview portion (qualitative phase). A total of 46 audio-recorded interviews with an average of about 35 minutes were conducted. Each interview was transcribed and coded, using pseudonyms to ensure complete anonymity.

Lastly a mixed methods matrix was created with the use of the software MAXQDA 18.2.4 to quantize the interview data. A mixed research matrix was used to integrate the qualitative and quantitative findings of the study. Throughout the study, multiple strategies were utilized to minimize the threats to internal and external validity (Onwuegbuzie 2003c) and credibility (Onwuegbuzie and Leech 2007) of the research findings as well as threats to the legitimation of the mixed methods findings (Onwuegbuzie and Johnson 2006). These measures will be presented and discussed in the following section.

Steps 9 & 10: Mixed Data Analysis and Legitimation

This mixed data analysis comprised of a quantitative, a qualitative and a mixed methods phase. The mixed data analysis was carried out using the seven-stage process of Onwuegbuzie and Teddlie (2003) for mixed methods data analysis. Six out of the seven steps were used: (i) an exploratory analysis of the quantitative data and descriptive statistics for the quantitative (data reduction), (ii) tables, charts and figures were used to present the qualitative and quantitative data (data display), (iii) the qualitative data was quantized while the quantitative data was "qualitized" (data transformation), (iv) the qualitative data was related to the quantized data and vice versa (data correlation), (v) the data collected from quantitative and qualitative sources were evaluated and compared (data comparison),

and lastly (vi) the qualitative and quantitative data were weaved into a coherent whole (data integration). In this study no new variables were created based on the merging of the data strands (data consolidation).

Quantitative data analysis phase

Descriptive statistics were obtained from the following students' demographic information: (a) age, (b) sex, (c) previous mathematics education, (d) campus, (e) the students' perception towards the physical chemistry content and (f) the students' perception on the appropriateness of teaching methods used. The scores from the appropriateness of teaching methods and previous mathematics education served as the independent variables while the perceptions towards physical chemistry served as the dependent variable. The scores yielded from the questionnaires were subdivided into four subscales (quadrants, Q), computed by adding the values assigned to the corresponding items. The subscale for student perception towards physical chemistry utilized the following coding system: strongly disagree = 1, disagree = 2, agree = 3 and strongly agree = 4. While the appropriateness of methods subscale utilized the coding system: seldom = 1, sometimes = 2, often = 3 and always = 4. Following the coding, the values were separated into distinct ranges which represented poor/not appropriate (Q1), fair/fairly appropriate (Q2), good/very appropriate (Q3) and excellent/extremely appropriate (Q4). The coding and ranges can be found in Table 3.

In addition to the descriptive statistics carried out, one-way between groups analysis of variance (ANOVA) was conducted to compare perceptions and appropriateness of methods between campuses. Effect sizes (η^2) were reported for all statistically significant findings and Cohen's criteria was used to assess the magnitude of these effects sizes as a precursor for determining the practical significance. Lastly, Pearson's correlation (r) and linear regression were employed to determine statistically significant

Table 3: Coding of quantitative variables.

Selection Variable	Min	Max	Q1	Q2	Q3	Q4
Student Perception towards Physical Chemistry	21	84	21-36	37-52	53-68	69-84
Student Views on Appropriateness of teaching methods	10	40	10-17	18-25	26-33	34-40

relationships between variables and to explain the variance (R^2) in the perceptions towards the physical chemistry content, respectively. The analysis was conducted with the use of SPSS version 27.

Benge et al. (2012) proposed a quantitative legitimization model and this model was used to determine the threats to internal and external validity for this study as a precursor to their minimization. The threats which were pertinent to this study were maturation, mortality, ecological validity and causal error. Maturation refers to the natural changes in a participants' perceptions and intellect over the course of time (Onwuegbuzie 2003c). This threat was minimized by administering surveys at the end of the thermodynamics teaching, thereby providing students with time to be adequately exposed to the physical chemistry material and the teaching and learning experience. This increased the potential for the researchers to capture the most accurate student perceptions on their physical chemistry experience.

Mortality occurs when participants fail to participate in every phase of the investigation (Onwuegbuzie 2003c). In a few instances, students seemed to grow tired of completing the survey or expressed that they did not have the time to complete the survey, which could have resulted in questions being left unanswered. To combat this, students were given a week after the administration of the survey to complete it, to ensure that as many students as possible were captured from the first-year physical chemistry student cohort at the Cave Hill, St. Augustine and Mona campuses. From a data analysis point of view, mortality refers to the extent to which this is a presence of missing data, case deletion, or reduction of group sizes in order to undertake a more balanced analysis (Onwuegbuzie 2003c). These possibilities have the potential to introduce or further compound bias into the study and thus to alleviate this threat in cases in which it appeared to be blatant false reporting (i.e., all answers being the same or all blank answers), these were removed.

Ecological validity speaks to the extent to which the conclusions from a study can be generalized to other settings (Onwuegbuzie 2003c). In this study, the population of students were from the three sister campuses – Mona, St. Augustine and Cave Hill, which offer chemistry degree programmes. Even though these campuses are all from the same university – The University of the West Indies, the researchers were careful to not use the generalized findings to describe the UWI climate, but rather to keep the data for each campus separate during analysis and discussion since each campus is immersed in its unique cultural setting.

Finally, causal error has the ability to affect the data analysis portion of the study when the research misinfers causality from a correlation between variables (Onwuegbuzie 2003c). Onwuegbuzie (2003c) argues that cause-and-effect relationships are best determined by the use of experimental studies and since this research is a non-experimental study, the investigators ensured that the interpretation of statistically significant variables between student perceptions towards physical chemistry and appropriateness of teaching methods utilised was treated and reported in such a way to convey no cause-and-effect relationships.

Qualitative data analysis phase

The qualitative research phase was conducted using a phenomenological approach and hence, the researchers served as an agent and instrument of data collection and analysis (Denzin and Lincoln 2000). As recommended by Onwuegbuzie and Leech (2007), multiple data analysis techniques were utilized to examine the convergence of data and illustrate and clarify the findings (Myers and Powers 2017). To enhance the minimization of the threat to trust worthiness of the research and maximize the truth value within qualitative data analysis, the observation checklist was filled out in real time. Further, the researcher documented thoughts using audio recordings and these interpretations were transcribed and added to notes taken in the class to form subjectivity journal entries (Lincoln and Guba, 1985). The contents of these subjectivity journals were then used to develop vignettes which are presented at various points in this paper, to help draw conclusions by providing a holistic view of the phenomenon under study.

Following the interview process, the interviews were transcribed. These transcriptions were subjected to member checking (Manning 1997), which provided the participants with the opportunity to verify their responses, thereby safeguarding the integrity of the voices to be heard in this research. Following the member checking process, the transcriptions were imported into MAXQDA 18.4.2 and coded. Saldaña (2013) suggests that investigators should be flexible when they are making initial decisions with respect to the coding process. Against that backdrop, the data coding was performed in three cycles. The first cycle of coding was based on the qualitative themes emerged from the pilot study, while the second cycle of coding included reorganizing, reanalysing the data, and adding any new codes based on the data. Then the final cycle facilitated the final review of codes and these finalized codes were subject to inter-coder agreement. Once the codes withstood the intercoder agreement

phase, they were used to make links and provide explanations for the qualitative data collected, which facilitated the identification of the qualitative themes.

The qualitative legitimation model presented by Onwuegbuzie and Leech (2007) was used in this study and five threats were relevant to this mixed methods study. These threats were researcher bias, confirmation bias and descriptive validity, and interpretative validity. In general, biases can present themselves in two forms: researcher and confirmation (Greenwald et al. 1986; Onwuegbuzie and Teddlie 2003). Researcher bias occurs when personal biases or assumptions which have the potential to interfere with study procedures. This type of bias is common threat to legitimation in constructivist research since the researcher serves as an "instrument" while collecting data (Onwuegbuzie 2003c; Leech and Onwuegbuzie 2007; Onwuegbuzie and Leech 2007). The qualitative phase of this research was done through a phenomenological design, where the primary researcher acted as an instrument in the study for collecting, analysing and interpreting the data. Consequently, researcher bias could not be completely avoided however, it was minimized as much as possible by researcher bracketing of personal biases and prior assumptions about the research phenomenon.

More specifically, as suggested by Onwuegbuzie et al. (2009), the chair of the research committee (Author 2), engaged the primary researcher (Author 1) in debriefing conversations which facilitated the exposure of the primary researcher's preconceived notions and these were written down. Shared thoughts and insights on the investigator's experience both within the classroom and during the interviews were also discussed. During the data collection processes subjectivity journals were kept and facilitated reflection and tracking of personal biases and finally a reflexivity (Onwuegbuzie et al. 2009) was provided in the writing of this paper.

Confirmation bias occurs when interpretations and conclusions drawn within a study are overly consistent with the researchers' predispositions or previous beliefs about the phenomenon under study (Greenwald et al. 1986; Onwuegbuzie and Teddlie 2003). This threat exists when there is at least one rival plausible explanation to underlying findings exists and is not explored. This threat was minimized through bracketing and ensuring that all possible explanations were explored within this study.

Descriptive validity refers to the degree to which there is factual accuracy in the qualitative data collected and documented by the researcher (Maxwell 1996; Onwuegbuzie and Teddlie 2003). This was minimized by

employing member checking as well as intercoder agreement to ensure that the data presented was as accurate as possible to further enhance trustworthiness and credibility (Onwuegbuzie and Leech 2007). Interpretive validity refers to the extent to which a researcher's interpretation of an account represents an understanding of the perspective of the participants under study and the meanings attached to their words or actions (Maxwell 1996). This was minimized during the interview portion of the study, where students were asked to explain any culturally specific vernaculars used in Standard English.

Mixed Data Analysis

MAXQDA 18.4.2 was employed to quantize that data yielded from the interviews. Code frequencies were generated to count the total number of codes that were utilized across all cases and per campus. Further, a side-by-side mixed research matrix was created and used to integrate the qualitative and quantitative data by assessing the convergence and departure of both data strands. A display of the data collection methods, methods of analysis and the associated research questions can be found in Figure 2.

The use of qualitative and quantitative techniques is advantageous as it facilitates significance enhancement and the ability to integrate these strands to accentuate the benefits of each approach while simultaneously compensating for the inherent weakness (Leech and Onwuegbuzie 2007). In compensating for the weakness of any methodology it is important to consider the validity issues associated with all data strands. Legitimation in mixed methods research is especially important due to the potential additive effect of the validity threats associated with both the qualitative and quantitative phases. Thus, the Onwuegbuzie and Johnson (2006) mixed methods legitimation model was used to identify the legitimation types which were applicable to this study. The pertinent six were sample integration, inside-outside, weakness minimization, conversion, paradigmatic mixing, commensurability and multiple validities.

Sample integration applies in situations where the researcher intends on constructing meta-inferences by merging the qualitative and quantitative phases (Onwuegbuzie and Johnson 2006). Since, the qualitative phases occurred with students who are a subset of the quantitative phase, this facilitates the statistical generalization to the larger population by providing explanations for the quantitative findings in the research. On the other hand, inside-outside legitimation refers to the extent to which the researcher accurately presents the viewpoints of both the observer and

the participants which are being studied (Onwuegbuzie and Johnson 2006). Due to the phenomenological approach to this study which required the researcher to be immersed within the study, peer review and member checking strategies were used for the transcribed data. In order to validate the researcher made observations, two researchers carried out independent classroom observations and the protocols were compared, and the researcher's interpretations were also examined. The researcher provided their insider knowledge and experiences in physical chemistry content and its teaching, while gaining new insights and understandings from the themes which emerged from the data. The "emic" perspective, which Onwuegbuzie coined to refer to emic (insider) and etic (outsider) viewpoints were combined and were maximally interactive in the mixed phase (Onwuegbuzie et al. 2010).

In order to strengthen meta-inferences made from the mixed methods research, the weakness from the quantitative approach were compensated by the strengths of the qualitative approach and vice versa (Johnson and Onwuegbuzie 2004). Onwuegbuzie and Johnson (2006) describe this as the legitimation as a means to minimize weakness of each individual methodological strand. In this study, the data collected from the perceptions and learning styles surveys answered the quantitative research questions but lacked sufficient information on how and why students engaged in certain behaviours or had specific views.

Conversion legitimation concerns the quality and interpretability of the data after undergoing a conversion technique (Onwuegbuzie and Johnson 2006). In order to quantize (converting qualitative data into numerical codes that can be analysed statistically (Tashakkori and Teddlie 2010). The qualitative data extracted in this study was coded and in order to minimize the possibility of over- or under-emphasizing emergent themes the three cycle intercoder agreement method previously stated, was utilized.

The dialectical pluralist stance involved a high level of paradigmatic mixing (Onwuegbuzie and Johnson 2006; Johnson and Onwuegbuzie 2010) which finds value in exploring competing dualisms (constructivist and post-positivism). As the principal investigator in this research study, it was incumbent on the researcher's perspectives and skills as both a qualitative and quantitative researcher to move between the two research strands seamlessly to address commensurability validity. Therefore, allowing for an integration of the two methods, and making what is called a Gestalt switch (Howe 1988; Reichardt and Rallis 1994) moving from just a pure qualitative or purely quantitative view point to a third viewpoint (mixed methods) which gives a more informed outlook on the research – a third eye.

Finally, the legitimization of multiple validities refers to the extent to which the qualitative, quantitative and mixed designs are addressed and resolved successfully (Christensen and Johnson 2010; Onwuegbuzie and Johnson 2006). Due to the nature of mixed methods study, this form of legitimization is an inherent feature in all mixed methods research studies and when conducted successfully, the overall quality of the meta-inferences made should be higher than any of the individual parts (Onwuegbuzie and Johnson 2006). Hence, providing deep rich explanations, which can to some extent be generalized over the participants or a group of participants.

Step 11: Interpretation of Data

Quantitative Results

A total of 474 students completed the perceptions survey (69% response rate). The statistical data as it relates to general perceptions of physical chemistry students towards physical chemistry content (PTPCC) and students' perception of the appropriateness of teaching methods (ATM) can be found in Table 4. The overall perception towards both the PTPCC ($M=54.06$; $SD=10.11$) and ATM ($M=28.83$; $SD=5.25$) were generally good

Table 4: The general perceptions of first-year students towards physical chemistry and the level of appropriateness of teaching methods used at the UWI.

	Sub-scale	Min	Max	Mean	Std. Error	Std. Deviation
Overall (Mona, St. Augustine & Cave Hill)	PTPCC	21.00	78.00	54.06 (Good)	0.464	10.11
	ATM	10.00	40.00	28.83 (Very Appropriate)	0.231	5.25
Mona (N=320)	PTPCC	22.00	76.00	55.73 (Good)	0.524	9.38
	ATM	15.00	40.00	30.48 (Very Appropriate)	0.252	4.51
St. Augustine (N=90)	PTPCC	24.00	78.00	53.43 (Good)	1.103	10.46
	ATM	10.00	38.00	26.57 (Very Appropriate)	0.510	4.84
Cave Hill (N=64)	PTPCC	21.00	62.00	46.27 (Fair)	1.093	9.89
	ATM	15.00	39.00	23.75 (Fairly Appropriate)	0.670	4.85

however, when considering the standard deviation, it revealed that there was some spread/variance in the values around the mean and therefore, should be investigated. Therefore, further analysis of each campus showed that the student's viewed the teaching methods used in physical chemistry classes Mona and St. Augustine as very appropriate, while at Cave Hill, they were seen as fairly appropriate. Additionally, Cave Hill students had fair perceptions towards physical chemistry, while St. Augustine and Mona students shared good perceptions.

When frequency distribution graphs showing the perceptions towards physical chemistry content and the appropriateness of teaching methods were plotted (Figures 3 and 4), the above findings were further confirmed.

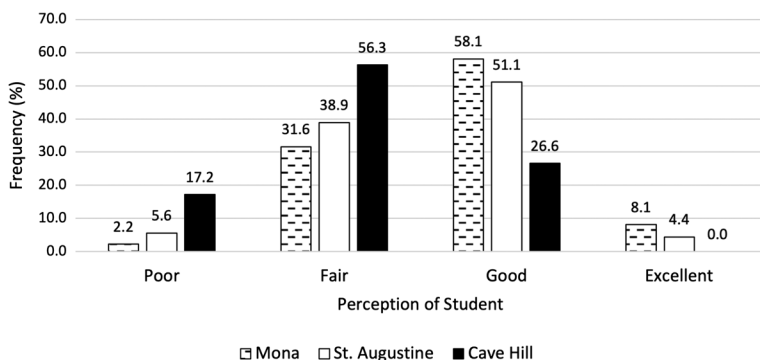


Figure 3: Frequency Distribution of the Perceptions of students towards physical chemistry content (PTPCC) at the UWI

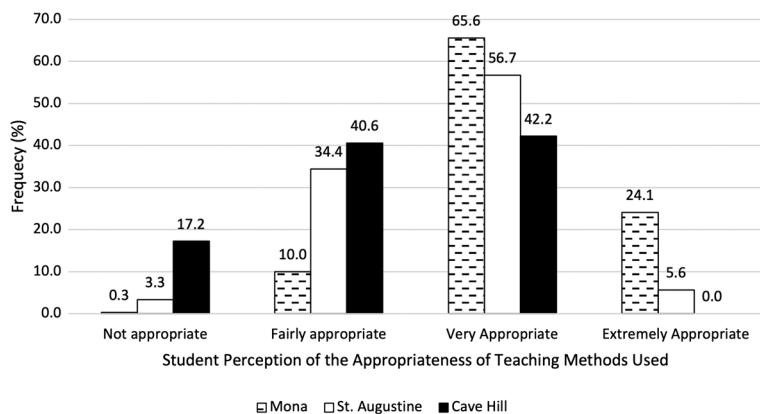


Figure 4: Frequency Distribution of the Perceptions of students towards the teaching methods utilized in physical chemistry teaching (ATM) at the UWI

With respect to student perceptions towards physical chemistry content, most Mona (90%), St. Augustine (90%) and Cave Hill (83%) students had fair to good perceptions with the majority Mona and St. Augustine students sharing good perceptions, while the majority of Cave Hill (56%) students reported fair perceptions towards physical chemistry. Notably, no Cave Hill students had excellent perceptions towards physical chemistry, but rather, had the greatest percentage of students bearing poor perceptions (17%) out of all three campuses.

As it relates to the appropriateness of teaching methods (Figure 4), at Mona 90% of the students felt that the teaching methods ranged from very to extremely appropriate with the majority reporting very appropriate methods being used. On the other hand, St. Augustine (91%) and Cave Hill (83%) students deemed the teaching methods fairly to very appropriate, with most of the St. Augustine students favouring very appropriate while the Cave Hill students' perceptions of the teaching methods used showed an almost a 50-50 split between fairly and very appropriate. The Mona students had the highest percentage of students who believed that the teaching methods were extremely appropriate (24%) while Cave Hill had none. Added to this, the Cave Hill cohort had the largest percentage of students who thought that the teaching methods were inappropriate.

A one-way between groups analysis of variance was conducted to further explore the differences in student perception towards the physical chemistry across the three campuses and is presented in Table 5. Since the sample sizes were unequal, we employed the use of Levene's statistic for both subscales and it was determined that the groups were homogenous ($p > .05$). There is a statistically significant difference between the PTPCC ($F(2,471) = 26.455$; $p < 0.0005$) and ATM ($F(2,471) = 41.166$; $p < 0.0005$) based on the campus of study. Further to this, the magnitude of the differences in means is relatively large for PTPCC ($\eta^2 = 0.101$) and ATM ($\eta^2 = 0.229$), this means that 10.1% of the variance in the perceptions towards physical chemistry content and 22.9% of the variance in the student view of appropriateness of the teaching methods used can be accounted for based on the campus of study. The qualitative portion of the study should help elucidate these variances.

Turkey's post hoc analysis (Table 6) further revealed that the Cave Hill students' perceptions towards physical chemistry content are significantly lower than those of Mona ($p < 0.0005$) and St. Augustine ($p < 0.0005$). In addition, there was no significant difference between the

Table 5: A comparison of the perceptions of students towards physical chemistry content based on the campus.

Sub-scale		Sum of Squares	df	F	Sig	Levene's Statistic	Partial Eta squared (η^2)
PTPCC	Between groups	4881.906	2	26.455	<0.0005*		0.101
	Within groups	43457.556	471				
	Total	48339.462	473				
ATM	Homogeneity of variances					0.508	
	Between groups	2981.867	2	69.846	<0.0005*		0.229
	Within groups	10053.947	471				
	Total	13035.814	473				
	Homogeneity of variances				0.695	0.364	

Table 6: Multiple Comparisons of the mean difference in students' perceptions towards physical chemistry content at each campus.

Campus	Campus	Mean Difference	Std. Error	Sig
Cave Hill	St. Augustine	-7.168*	1.571	<0.0005*
	Mona	-9.525*	1.315	<0.0005*
Mona	St. Augustine	2.298	1.138	0.109

perceptions towards physical chemistry of St. Augustine students and Mona students ($p > 0.05$).

While Table 7 suggests that Mona students have significantly better perceptions towards the appropriateness of teaching methods at their campus than those at St. Augustine ($p < 0.0005$) and Cave Hill ($p < 0.0005$). In addition, the students view on appropriateness at Cave Hill were significantly lower than that of the St. Augustine ($p < 0.05$) cohort.

A Pearson's correlation (r) was performed to gain an insight into the relationship between the appropriateness of the teaching methods used and student perceptions towards physical chemistry content. These values are presented in Table 8 and the interpretation of these values was guided by Burns (2000). There were weakly positive statistically significant relationships between the appropriateness of teaching methods and the perceptions towards physical chemistry content at each campus at the Mona campus. While the relationship between these two variables at Cave Hill and St. Augustine was moderate and therefore substantial. This finding aligns with the literature, since the more appropriate the physical chemistry teaching methods, it is expected that there will be more positive perceptions towards the physical chemistry content, due to increased understanding of the content [Kousa et al. 2018].

Table 7: Multiple comparisons of the mean difference in students' perceptions towards the appropriateness of teaching methods at each campus.

Campus	Campus	Mean Difference	Std. Error	Sig
Mona	St. Augustine	3.911*	0.5514	<0.0005*
	Cave Hill	6.728*	0.6326	<0.0005*
Cave Hill	St. Augustine	-2.817*	0.7555	0.001

Table 8: The relationship between students' perceptions towards physical chemistry and their perceptions towards appropriateness of teaching methods used at each campus.

Campus	Variables	Pearson's Correlation (r)	Sig (2-tailed; 0.01 level)
Mona	ATM	+ 0.327	<0.0005*
St. Augustine	ATM	+ 0.470	<0.0005*
Cave Hill	ATM	+ 0.504	<0.0005*

Summary of Quantitative Results

In summary, the students in the Mona group ($M=55.73$ (good); $SD=9.38$) had the most positive perceptions towards physical chemistry content, then St. Augustine ($M=53.43$ (good); $SD=10.46$), while Cave Hill ($M=46.27$ (fair); $SD=9.89$) had the poorest perceptions towards physical chemistry content. In addition, the Cave Hill group shared significantly poorer perceptions towards physical chemistry content than the St. Augustine and Mona students.

In addition, the most appropriate methods were employed at the Mona campus ($M=30.48$ (very appropriate); $SD=4.51$) while St. Augustine ($M=26.57$ (very appropriate); $SD=4.84$) campus also employed appropriate methods, however on the lower end of the Q3 subscale (26–33). The Cave Hill cohort ($M=23.75$ (fairly appropriate); $SD=4.85$) felt that the teaching methods used were the least appropriate of all the campuses and further the method appropriateness was viewed significantly less appropriate than the methods utilized at the St. Augustine and Mona campuses.

For all groups at the UWI, the perceptions towards physical chemistry content had positive significant relationships to the students' view on the appropriateness of teaching methods used – Mona ($r=0.327$; $p<0.0005$), St. Augustine ($r=0.470$; $p<0.0005$) and Cave Hill ($r=0.504$; $p<0.0005$). Therefore, it can be said that to some extent the more appropriate the teaching methods are, the more positive the perceptions towards physical chemistry content.

Qualitative Results

Nicoll and Francisco (2001) posit that in order to understand student's success in physical chemistry we must first consider their perspectives of the content and explore why they may be experiencing difficulties.

Therefore, the qualitative portion of this study was aimed at elucidating exactly that. It revealed salient findings about the perceptions towards physical chemistry content at each campus. In particular, most of the students irrespective of their campus indicated that physical chemistry is mathematically intensive and therefore requires previous knowledge in mathematics in order to be successful. Added to this, they noted that physical chemistry can be enjoyable and understandable once there is teaching style and learning preference complementarity which has the ability to decrease the abstract nature of the content. Hence, the four emergent themes from this study were: (a) students' preference towards physical chemistry (b) mathematical nature of physical chemistry, (c) challenging nature of physical chemistry and (d) teaching/learning process complementarity and these can be found in Table 9. Please note that ticks represent prevalence of theme while dashes represent absence of the theme.

Students' Preference for Physical Chemistry: Affinity or Antipathy?

Emotion is an extremely important part of human cognition. It influences and modulates many cognitive processes (Tyng et al. 2017) such as a student's ability to learn, pay attention, remember, reason and problem

Table 9: Themes emerging from interviews probing students' perceptions towards physical chemistry content at the UWI.

Themes	Sub-Themes	Emergence by Campus		
		Mona	St. Augustine	Cave Hill
Students' Preference towards Physical Chemistry	Affinity	✓	✓	✓
	Antipathy	-	✓	✓
Mathematical Nature of Physical Chemistry	Requires a prior knowledge in maths	✓	✓	✓
	Mathematically laden	✓	✓	✓
Challenging Nature of Physical Chemistry	Conceptually difficult	✓	✓	✓
	Abstract/Theoretical	-	✓	✓
Teaching and Learning Process Complementarity	Appropriate teaching methods	✓	✓	✓
	Inappropriate teaching methods	-	✓	✓

solve. Most pertinent to this study, it greatly influences a student's overall perception of the object under study (Tyng et al. 2017). Emotion has a strong influence on where a student places his or her attention, as well as what motivates their action and behaviour, which is intimately linked to the learning process (Tyng et al. 2017). Hence, this qualitative discussion of themes will begin with students like or dislike of the physical chemistry content.

The theme of affinity to physical chemistry was frequently mentioned within the Mona and St. Augustine groups while hardly mentioned in comparison within the Cave Hill cohort. Kendra from Mona cheerfully remarked, "My math is not so good... Physical Chemistry is actually the part of Chemistry that I enjoy right now. I like it because it makes sense. Just the systems overall, you can use logic and actually apply it to real life things like the labs. The examples that Sir typically uses in class are like in lab things and it makes more sense to me that way. Anything that can come back to like a real-life experience and I can go through it logically step-by-step, that's good for me! I love it!". Kendra described that her love of the physical chemistry content was directly related to her understanding of the content which was made possible through the instructor's ability to deliver the concepts accompanied by real-life examples. Thus, signaling that her affinity to physical chemistry was related to the use of an appropriate instructional strategy. Of the entire interviewee population, across all three campuses, Kendra was one of the only two students who did not attribute their like of physical chemistry solely to their strong proficiency in mathematics.

Interestingly, all other comments about students' affinity to physical chemistry content were couched in their ability to grasp the mathematics. Both Mona and St. Augustine students attributed their like of physical chemistry to their understanding of the content which was assisted by their mathematical prowess. For instance, Nathan from Mona explained, "I like Phys Chem, ahm... I like the mathematical background of it. I think that I understand it as well, because everything is connected. So, since everything is connected, once I understand the calculations, I can understand the theory and then once I understand the theory, I can understand everything so that's why I like it." Charles from St. Augustine mirrored this response by saying, "I'm good at Math, in a way, so with Physical Chemistry, even though the concepts are hard to grasp, once I have the equations, I know how to manage my way through it. Even the little integration and differentiation, the derivation of the equation and stuff, I can get through that because I know the Maths a little bit.

I can survive 'cause I real good at calculus". Upon further analysis of these statements, students seem to suggest that not only do they enjoy physical chemistry because they understand it but they are able to cope with difficult concepts within the content since they have a firm grasp of the mathematical component. This aligns with a recent work by Cole and Shepherd (2019) which asserts that students who are proficient in mathematics are able to bypass conceptual understanding in physical chemistry by hunting for formulas rather than engaging in meaningful application of the mathematical models. Hence, mathematical prowess provides an alternative pathway to success if students are unable to understand the concepts.

The sentiments of the Cave Hill group who claimed to like physical chemistry echoed the student views of the St. Augustine and Mona students. Added to this, those students had all done CAPE mathematics, which further supports the notion that a previous experience in mathematics increases the ease with which students navigate the content and thus, the appreciation they have for physical chemistry. However, one notable view was that of Zacchary who proclaimed, "I love, love, love, love Phys Chem, and the abstract concepts are interesting, but the numbers are what get me. Numbers turns me off. I'm no good at math and that makes this so difficult and the part I don't like and that's probably why I fail the tests." In this case, the student has an appreciation for the concepts involved in physical chemistry but does not like the mathematics portion, and further claims that his mathematical proficiency is poor. Therefore, the application of complex mathematics is a potential reason for disliking certain components of physical chemistry content (Tsaparlis 2016).

On the other hand, feelings of dislike can result in a loss of interest in the subject matter, followed by decreased motivation to grapple with work. This can create barriers to learning for the students, adding to the conceptually difficult nature of physical chemistry. From the Mona cohort there were no students captured who resonated with the theme of antipathy towards physical chemistry, however, the St. Augustine students who admitted to disliking physical chemistry wholeheartedly believed that it was because of their inability to understand physical chemistry. St. Augustine's Grace solemnly professed, "Dah Course, like, oh my God. I cried, multiple times as we got assignments and everything, it's because I don't understand the concepts. It's the worst experience, I hate it. In class I'm lost". In this case, the dislike of physical chemistry seems to be only attributed to the lack of understanding in the concepts.

Cave Hill students ascribe their abhorrence to both their lack of conceptual understanding and the mathematics. For instance, Sandra anxiously admitted with tears flowing down her cheeks, "I catch panic attacks from physical chemistry, like severe attacks ma'am. I guess I feel like I will never get it done and I need to pass to move forward. It does s-t-r-e-s-s me out! I don't understand the topics or concepts. I don't like it as a subject, plus I never did calculus so that's another thing, so I don't understand nein [nothing]. I does try with the theory but the level of math is unruly and unreasonable and a lot. I went to the head of department to try to get out of it, but I need it for my major."

When this statement is unpacked, this particular student dislikes physical chemistry so much that it triggers sudden episodes of intense fear which appears to be multi-layered – her inability to understand the conceptual content, the mathematically intensive nature of the course and coupled with the absence of a previous experience with calculus, she is unable to grapple with the concepts. Since mathematical experience, ability and understanding correlate in a positive way with success in physical chemistry and positive perceptions (Nicoll and Francisco 2001; Hahn and Polik 2004) this finding aligns with the literature.

Mathematical Nature of Physical Chemistry

The mathematically rich nature of physical chemistry requires students to be competent with a significant amount of mathematics. Therefore, a successful physical chemistry student must demonstrate dexterity with integration and differentiation among other calculus topics (Neville et al. 2018). The low proficiency and discomfort with calculus can create a significant hurdle to student's success in physical chemistry and the connect the systems they study and describe in physical chemistry to the mathematical concepts (Fox and Roehrig 2015).

The mathematically intensive nature was a reoccurring theme at each campus. From the Mona group, Mason avowed, "I would say for the average person it takes quite a lot of mathematical application. So, if you are not mathematically inclined, you have to sit down and apply yourself a little more, because its hard without those skills." This notion was reiterated when St. Augustine's Harmony declared, "I don't have that big of a math background, that's the difficult part for me" and Cave Hill's Emma added, "Math is where I get lost, it is be too much sometimes. If yuh don't know math, its over!"

Greater barriers can be created to physical chemistry, especially since some universities do not teach the prerequisite mathematics required for

the physical chemistry courses they offer (Neville et al. 2018). Rather, there is an assumption made that by the time you get to the course, the students already have been previously exposed to the mathematics required. Mason from Mona professed, "my CAPE math played an important role in me understanding" and Megan from St. Augustine further helped unpack this sentiment by saying, "I've had experience with the math, so I am able to apply equations. I had to do N1 math [preliminary math] since I didn't do math past CSEC so that really helped me with phys-chem." Hence, previous exposure to the mathematics may help students understand the mathematical content. Further, since Mona and St. Augustine both have mathematics prerequisites in place for matriculating students, and provide courses for students to take if these prerequisites are missing, students from these two campuses are more equip to handle the mathematical nature than those at Cave Hill.

Studies by Bain et al. (2014) and Bain and Towns (2016) revealed that student's success in mathematics, as well as mathematical proficiency, are paramount to success in physical chemistry. Furthermore, mathematical proficiency is used as a predictor of student's performance in physical chemistry. Hence, students who may have never been exposed to calculus before undertaking the introductory physical chemistry course content may be greatly affected by this deficiency and this is evident at the Cave Hill campus. Cave Hill's Naomi complained, "I feel like CAPE Maths would have more prepared me for Phys Chem than CAPE Chemistry" signaling that she felt relatively unprepared without the previous exposure of calculus. Further to this, Zacchary said passionately, "Like I said already, I am not mathematically minded. I only did CXC math - I mean CSEC math, and not CAPE nor advanced math. So that's why I struggle with Phys Chem and all the calculations. That's why some people get it 'cause they did it". From these statements, students are aware that a strong mathematical foundation is a necessary tool in the journey to grasp physical chemistry concepts. The lack of pre-exposure to calculus would have contributed greatly to their inability to manipulate mathematical postulates and further understand the concepts.

Another notable finding as it relates to the deficiency in mathematics is that it is quite possible that added to the lack of pre-exposure to calculus, students may have more elementary deficiencies within areas such as transposition of algebraic equations and simplification of algebraic expressions. This finding was highlighted when Emma from Cave Hill said, "I had a fear of not remembering formulas and then when I would do out the formula, I realised that like, I would have to transpose or stuff

like dah and I would get it wrong – like when things move to the other side of the equation and stuff". Additionally, Parker from the same campus reiterated this sentiment by saying, "So, the understanding to rearrange and manoeuvre around the equations to get to the final thing that we need was challenging 'cause, dem got a loh [there are a lot of] equations". This finding is particularly astounding since the literature suggests that quantitatively there is no significant relationship between algebraic knowledge and success in physical chemistry, but that there is a significantly positive relationship between calculus knowledge and success in physical chemistry (Derrick and Derrick 2002).

Conceptually Difficult due to the Abstract or Theoretical Nature

Physical chemistry involves abstract and complex concepts and processes, so learning is difficult without a thorough understanding of the subject (Tsaparlis 2007). These complicated and invisible concepts force students' thinking to be heavily dependent on sensory information. Therefore, if the student lacks substantial conceptual knowledge and visual-spatial ability, they are unable to translate the concepts into more understandable representations (Wu et al. 2001).

In this study, outside of the poor proficiency in mathematics, one of the main challenges for students in physical chemistry is the level of abstraction associated with the concepts. From the St. Augustine and Cave Hill groups, some students attributed the challenges they faced to both the theoretical and abstract nature. An exemplifying statement describing the theoretical nature came from Danielle when she said, "I understood the concepts but, I think that I cannot not see how it links to actual life". Felix supported Danielle's view when he said, "It's a lot of abstractness, so I didn't get it. I couldn't get past that so; I didn't see how it could be applied since I need to visualise the concept for me to then kinda see how it works". Further, Cave Hill's Aimee complained, "It just seems so abstract, like, it's just as though somebody just put something there and said that's it. But why? I don't know why it is so abstract. Some of the concepts are hard to visualise in yuh head. I tend to like things that I understand more, maybe if it was done in a practical, I would understand. If I don't understand something, I am not going to like it as much."

These statements resonated with the literature in work done by Tsaparlis (2007), involving the teaching and learning of physical chemistry, which argued that students prefer and find it more easy to navigate their way around concrete or simple abstract models. This preference makes it relatively difficult with physical chemistry because the concepts

are seen as complex, abstract and theoretical models. Moreover, the perceived abstract nature of physical chemistry was consistent with the literature, where often students attribute their learning difficulties associated with physical chemistry to the abstract nature of the concepts and their inability to visualize the concepts (Sözbilir 2004; Bain et al. 2014; Ayyildiz and Tarhan 2017; Saricayir et al. 2016).

On the other hand, it should be noted that the interview portion of the study did not capture any students from Mona who attributed their challenges to abstraction or the theoretical nature. Even though it cannot be definitively ruled out that there were Mona students who were in agreement with this idea, the level of complementarity in the teaching and learning process may be able to provide meaning for the seeming absence of this sentiment.

Complementarity within the teaching and learning process

Sözbilir (2004) recommended that when teaching abstract concepts within physical chemistry the qualitative understanding should precede the mathematical derivations and numerical calculations. In addition, the use of context-based explanations can help with making concepts seem less abstract by providing context (Dori et al. 2018), for example, through the use of real-life scenarios. Hence, bringing abstract and theoretical concepts from the imperceptible to reality is done through creating opportunities for visualization (Wu et al. 2001). These opportunities are initially presented within the classroom through instruction (Wu et al. 2001) and the effectiveness of their presentation and digestion is affected by the conditions under which they are presented to the student – classroom environment.

There is much contention in the literature as it relates to the existence of learning styles and one of the most compelling arguments against their existence is the failure of empirical support (Bretz 2017). This is due to the low reliability coefficients yielded by learning style instruments, rendering them unreliable (Coffield et al. 2004), which suggests that students do not have a specific learning style preference. However, what can be said with certainty is that students differ in their previous knowledge and experiences, their abilities and interests and because of this may have a propensity to utilize certain strategies to tackle certain problems (Willingham et al. 2015). However, there is no evidence that suggests that they will cater to a specific learning style in order to lead them to a better learning experience (An and Carr 2017). Hence, the onus is on the instructor to conduct their classes in such a manner that is most appropriate for the content of the course, student ability, the level of prior knowledge

student process and their interests (An and Carr 2017). Therefore, as it relates to physical chemistry, instructors must use instructional methods which provide opportunities for visualization embedded within context-rich scenarios, as previously stated. It is against this backdrop that good complementarity within the teaching and learning process for the purposes of this study, is characterized by a learning environment in which there is good student-instructor rapport accompanied by instructional strategies which employ the use of context-rich scenarios, as tools to increase visualization of abstract and theoretical physical chemistry concepts, thus reducing the perceived abstract nature.

All Mona students who were interviewed expressed their pleasure with the execution of the teaching and the explanations given within the classroom. One such student was Fiona who mentioned, "I like that all you need to do is pay attention and the slides don't really have a lot of fluff. The information is all there and what he's teaching, and he also connects what he taught last lecture so you, understand the flow of where the information was going." Irene further praised her lecturer by saying, "The thing about him is that you can stop him right where he is in lecture to get him to explain it to you and if not, he'll take the time at the end to explain to you and I really appreciate that". These characteristics were all evident in the classroom and are presented in the Mona vignette below.

At the beginning of class students cheerfully talk with each other. When the lecturer entered the room, the class quickly settled, followed by a prompt commencement of class on the hour. The lecturer did a quick recap of the previous class and highlighted the objectives to be covered. As the class progressed, the atmosphere remained very light and carefree. Students appeared visually stimulated and engaged as evidenced by their expressions and posture. The PowerPoint slides were colourful, informative but succinct, with many diagrams which presented laboratory or real-life examples of how each concept was used, followed by the associated mathematical postulates. A small percentage of the class appeared disinterested. Some of whom changed their focus to their devices. Some students seemed confused while others whispered to colleagues about the slides. The lecturer demonstrated his withitness by noticing those who seemed lost and on one occasion said, "I know the thermodynamics may seem difficult because it has some abstract concepts, but it's not so bad, let's go through it again. Do you have any questions before I go over it?" A few students would ask questions about the concepts and he would answer with a thorough explanation. Students seemed to be receptive of the explanation signalled by a change to a less troubled expression or an "okay, I get it now Sir, thanks". The lecture would conclude at half past the hour and the lecturer would give students the option of leaving or staying behind for a 20-minute question and answer segment. In this time, they were free

to ask any questions they wanted to about the content covered in class on that specific day or previously. After class, the atmosphere was quite light and calm as if all was well and understood. – Observer

As we take a deeper look at the vignette, the instructor was able to explain the concepts in a way which seemed to be palatable for confused students who appeared to have their cognitive conflicts resolved in real time. We believe that this was due to the instructor's use of good explanations and further the rich and plentiful use of real-life scenarios. Kendra attested to this when she reported excitedly, "His explanations are bomb!". Her excitement overflowed when she continued by giving an example, of one of the concepts which resonated with her, "One day he was talking about having a can on a shelf, which was higher, versus one on a table. He explained that the work being done against gravity by the can on the shelf would be more than if it was on the table, since work equals force by distance [Work=force \times distance] and when the distance increases the work would also increase. It was at that point that it clicked!" It was clear that the use of this real-life example was effective and resonated with Fiona and most likely with many other students in the class. Therefore, there was good complementarity in the teaching and learning process at the Mona campus.

At the St. Augustine campus, while there was less excitement than the Mona cohort on the teaching and learning experience, some students shared conflicting views. Danielle complained, "She doesn't make the link in class. I think I would understand the concepts a bit better if she did. So, I'm good with describing the concept but when you ask me to apply it, I'm out to sea!" Felix supported this view when it said, "I didn't see how it could be applied... I don't think she explained it in class". These statements suggest that the lecturer did not provide adequate explanations which allowed them to visualize the abstract concepts and further did not link the information to real life.

Curiously, the viewpoints of Danielle and Felix stood in direct opposition to those of others, who believed that the concepts were presented in an appropriate way. Janet described the environment as one where the lecturer "reads the slides and then explains the information." She added, "I like that I can understand everything that's happening and why it's happening and also that she gives examples in class on how to apply the knowledge to problem solving questions and she goes through the solutions either next class or the same time depending on time." Sheila explained her experience as one that was good due to the sequential nature of how the concepts were presented, "she took us through in a very

step by step manner and it related to life, I just felt it could be less boring." Considering these contradictory views, it was prudent to consult the information on classroom experience at the St. Augustine campus which is presented in the vignette below.

Prior to the instructor's arrival the class was unusually quiet. When the lecturer walked in, she greeted them with a cheerful "Good day!" and the class responded lacklustrely, "Hi Miss". The instructor took attendance, recapped and highlighted the objectives for the class. Immediately after, 11 students left the class, never to return. These students seemingly came to class just to have their names recorded on the attendance sheet. The rather dull atmosphere persisted, as she began to read and flip through the PowerPoint slides. The slides were filled with useful information as well as graphs and diagrams accompanied by many real-life examples. In addition, there were multiple problem-solving examples given in class which were explained in a step-by-step manner. Most students seated from the 4th row, all the way to the back of the class, seemed disinterested, as they were either on their phones or sleeping in class. However, those who were interested in the class asked questions and were met with thorough explanations. By the end of class, most of the students left the room as soon as they were dismissed while a few eager students would approach the lecturer to ask follow-up questions. – Observer

In light of this classroom experience, it was clear that the instructor in fact did provide real-life examples in class. During the interview, when Felix and Danielle were probed about how often they attended class, they both admitted that they would go to class for the first 10 minutes to be marked present on the register and then leave since the notes would have been posted online – they felt bored in class. This was confirmed by the observer as these students were a part of the eleven who left the class early. Further, absences and disinterest in the class may have been due to the persistent humdrum nature of the atmosphere.

Hence, the most probable explanation for the St. Augustine interviewees having conflicting views was the absences of students from class. However, even though students may not have felt fully engaged in the learning experience, those students who were present for the explanations, believed that the instructional strategies utilized were effective and this further solidified the importance of including real-life examples within physical chemistry teaching. Hence, the St. Augustine learning and teaching complementarity was moderate compared to the Mona campus.

Finally, the Cave Hill cohort had mixed views on the complementarity of the teaching and learning process, with the more negative views outweighing the positive ones. One student who praised the instruction was Bridget who said, "When he takes the time to explain, I understand the stuff he is talking about, it's not so hard." On the other hand, Parker

added, "I think he needs to draw more diagrams or find a way to explain the stuff you can't exactly visualise". Hence, this student believes that the class lacks visual aids to help with the abstract concepts. Further Fay added to this sentiment by saying, "So like more examples uh how it relates to the world; that would be, really helpful and he moves too fast. I learn slower so I can [cannot] keep up with him". Therefore, the lack of real-life scenarios contributed to the negative views that students shared within the Cave Hill cohort. In addition, Fay seems to be suggesting that the instructor moves quickly when explaining concepts and therefore, we must not only to consider the opportunities that have been given for visualization of abstract concepts but also the conditions under which these concepts have been taught. Therefore, the vignette is presented below to facilitate a panoramic view of the Cave Hill experience.

"Ha ha ha ha" is all that can be heard coming from all directions of the lecture room until the instructor rushed in and greeted the class. The students responded and quickly ran to their seats. Just as the marker began to glide across the whiteboard with a squeak, the rather jovial atmosphere of the room quickly transitioned to one which could only be described as taut. As the instructor went through the content of the course, some students just sat and stared at him befuddled, while others feverishly scraped down notes and a few talked to each other. "Thermodynamics is abstract. It's helpful if you know calculus - how's your math?", barked the lecturer. An uncomfortable laugh filled the room which lasted only for a couple of seconds before it returned to its sombre atmosphere punctuated by the chit chat of the students. Pleads for quiet were repeated at least 6 times within a 50-minute period. I, the observer, felt frustrated even though I wasn't the person teaching. Good and clear explanations accompanied by a couple of diagrams were provided with very few, if any, real-life examples. Most students seemed unmoved, nonchalant and many talked through them. While a few seemed happy with the explanations, many held their heads hopelessly in their hands. Occasionally, a student would admit that they were lost and though re-explained most still appeared confused. As time elapsed, with not much completed, the instructor began to discourage student questions by asking them to leave all queries until the end of class. As he tried to progress from topic to topic and he had to erase the board to make space for new notes, "chooooopeess" was the sound that could be heard from the back of the room as students sucked their teeth with frustration as they had not finished writing the notes. This cycle repeated itself, class after class. - Observer

Within this Cave Hill classroom, it was evident that many of the students were disinterested in the physical chemistry class as many were not paying attention. During the interview, the students were asked about the continual talking in the class, Bridget explained,

"I feel like if people actually like, took the time to like listen to what he is saying, you would understand. The concepts are hard to see but when

he actually explains it helps. I just don't like that he rushes through everything. But, I can't be unfair to him 'cause the class is always talking too. Like they are always talking, people tell me they just come for the notes 'cause they don't understand the stuff anyway. It's rude, I don't know why they talk so much and then Sir he has to take like five minutes or ten minutes just to explain something, so the time just disappears. Then he gets angry when people ask him to explain the same thing again or go in baby steps. I don't know, class is just a mess."

Bridget's explanation was relatively eye opening as to why students were behaving in such an ill-mannered way. It seemed as if students had given up on trying to understand the information in class and therefore, were only present to acquire the notes since they were written on the whiteboard. It is probable that they would have stopped attending if the notes were put on the online platform. Further, Bridget admitted that his explanations were helpful even though she still found the concepts abstract. This was expected since the Cave Hill students did not receive as many context-rich examples and explanations as compared to the students at the Mona and St. Augustine campuses. Thus, would have shown the poorest learning and teaching process complementarity. Hence, opportunities must be made for visualization when dealing especially with abstraction so that students them can cultivate and develop these skills on their own. Hence creating a more effective and positive classroom environment (Bretz 2017).

Summary of Qualitative Data

In summary, students at all three of the campuses believed that physical chemistry content is mathematically intensive, requires a previous experience in calculus, is conceptually difficult but the concepts are interesting which make them enjoyable. However, students from the St. Augustine and Cave Hill campuses attributed their difficulties to the mathematically laden, abstract nature and the theoretical nature while Mona students only attributed their difficulties to their low proficiency in calculus. Furthermore, students at the Cave Hill campus seemed mathematically disadvantaged by being the only campus which did not enforce a prerequisite for mathematics, which may have further exacerbated the Cave Hill students' difficulty with math.

There is a stark difference in the teaching and learning environments at each campus which may have seriously attributed to students' view of content difficulty. The Mona campus seemed to provide the most authentic learning experience, while St. Augustine and Cave Hill, provided

a "chalk and talk" experience. Moreover, students from the Mona and St. Augustine campuses were of the view that the content was taught appropriately due to the multiplicity of context-rich examples, scenarios and diagrams that were provided. However, St. Augustine students were less engaged due to the dull atmosphere in their learning environment. Finally, most Cave Hill students seemed dissatisfied with the lack of appropriate methods used and comported themselves as such.

Integrative Mixed Methods Analysis and Discussion

The mixed methods analysis facilitated the integration of the quantitative and qualitative findings as well as an examination of the convergence and divergence of these strands. A joint display matrix comparing the qualitative and quantitative findings in a side-by-side manner can be found in Table 10. More intuitively, the matrix presents the quantitative perceptions for each campus compared to the theme frequencies/prevalence of the qualitative theme for each campus. Please note that the "excellent" and "good" categories of perceptions are grouped as "positive" perceptions while the "fair" and "poor" categories are grouped as "negative" perceptions. In terms of teaching methods, the "not appropriate" and "fairly appropriate" categories are grouped as "ineffective" (IE) while the "very appropriate" and "extremely appropriate" categories are grouped as "effective" (E).

The comparison between qualitative and quantitative findings showed that firstly, the Cave Hill (15%) cohort was the least concerned about their preference towards physical chemistry content (antipathy and affinity combined), which was evident in the interview process, since most of the conversations situated themselves around the mathematical content. Therefore, it was no surprise when the joint matrix further revealed that the majority of Mona (48%) and Cave Hill (45%) students were mostly concerned with the mathematical nature (mathematically laden and requirement of math prerequisite combined) of the physical chemistry content. While most Mona students speak to the fact that physical chemistry content is mathematically laden, the Cave Hill students seemed more bothered by the fact they need math as a prerequisite. On the other hand, St. Augustine (27%) students are the least concerned with the mathematical nature.

Notably, the Cave Hill students who spoke to mathematically laden nature all had negative perceptions and further, only the Cave Hill cohort had negative perceptions associated with their view on the requirement of

Table 10: Joint display matrix presenting the comparison of emergent qualitative perceptual themes with the quantitative findings.

Quantitative Scale		Perceptions towards physical chemistry content					
Campus		Mona		St. Augustine		Cave Hill	
Mean Perception (code)		55.73 (Good)		53.43 (Good)		46.27 (Fair)	
Quantitative Perception (Frequency of students)		+ve (66%)	-ve (34%)	+ve (56%)	-ve (44%)	+ve (27%)	-ve (73%)
QUAL Themes (code frequency)	Preference towards Physical Chemistry	✓	-	✓	-	✓	-
	Affinity			38%			5%
	Antipathy	-	-	-	✓	-	✓
	Mathematical Nature	✓	0%	3%	✓	-	10%
	Mathematically laden	31%	✓	15%			17%
	Requires prerequisite of mathematics	17%	✓	12%	-	✓	28%
	Challenging Nature of Physical Chemistry	-	✓	-	✓	-	✓
	Abstract/Theoretical	-	17%	-	7%	✓	13%
		0%		4%		✓	6%

(Continued)

Table 10: (Continued)

Quantitative Scale		Perceptions towards physical chemistry content		
Campus		Mona	St. Augustine	Cave Hill
Mean Perception (code)		55.73 (Good)	53.43 (Good)	46.27 (Fair)
Quantitative Perception (Frequency of students)		+ve (66%) -ve (34%)	+ve (56%) -ve (44%)	+ve (27%) -ve (73%)
Quantitative Scale		Appropriateness of teaching methods		
Campus		Mona	St. Augustine	Cave Hill
Mean Perception (code)		30.48 (Very App.)	26.57 (Very App.)	23.75 (Fairly App.)
Quantitative Perception (Frequency of students)		E (90%) IE (10%)	E (62%) IE (38%)	E (58%) IE (42%)
QUAL Theme	Teaching and Learning Process	✓	✓	✓
(code	Complementarity	6%	22%	20%
frequency)				

mathematics as a prerequisite. As previously stated, at Cave Hill many students matriculate without a previous experience in calculus, since mathematics is not required as a prerequisite and are provided with no alternative course requirement at the campus to help scaffold the students in the mathematics required.

Mona (17%), St. Augustine (11%) and Cave Hill (18%) students all find the physical chemistry content challenging (abstract/theoretical and conceptually difficult combined). Interestingly, the Mona students who shared negative perceptions with respect to this theme attributed them to conceptual difficulties and not to the abstract/theoretical nature, while Cave Hill and St. Augustine students attributed their negative perceptions for this qualitative theme to both sub-themes. Recalling the discussion in the previous section on learning and teaching complementarity, there seems to be intricate link between the teaching methodology utilized and the perceived abstract nature of the physical chemistry concepts. Thus, the more appropriate the methods utilized the greater the reduction of the perceived abstract nature.

There was good complementarity in the teaching and learning process at the Mona campus, since the lecturer taught the abstract concepts using context rich scenarios and examples, which provides an explanation for why the theme of abstractness was absent for the Mona environment (Table 9). Hence, the highly appropriate nature of the teaching strategies used, and the teaching support provided meaning for why the majority of students quantitatively reported that the teaching methods were effective. Added to this, the effectiveness of the teaching is most likely why the students at Mona were the least concerned with the teaching and learning complementarity and only a meagre 6% referenced it, and those who referenced it shared positive perceptions only. However, at both St. Augustine (22%) and Cave Hill (20%), the prevalence of this theme was more than that of Mona and was encompassed in both effective and ineffective teaching methods.

From the St. Augustine viewpoint, there was relatively good complementarity with the use of appropriate teaching methods, however, the classroom environment was one of humdrum, where there was a lack of student engagement. Contrarily, there was poor complementarity at the Cave Hill campus, even though the instructor gave good explanations, there was a lack of context rich examples. Further, the atmosphere was one which seemed frustrating to teach and learn in and hence may have contributed to the negative perceptions associated with the effectiveness of the teaching experience.

Overall Comparison

There were positive statistically significant correlations at each campus between perceptions towards the physical chemistry content and the appropriateness of the teaching methods used in physical chemistry. Therefore, the more appropriate the methods used to teach the content, the better the student perceptions towards the physical chemistry content. These correlations helped to shed light upon the significant difference revealed in the ANOVA between the perceptions of Cave Hill students towards physical chemistry and St. Augustine and Mona cohorts. It was astounding to see that none of the campuses utilized animations or simulations in their teaching, especially since there is currently much research which posits the effectiveness of visualization of abstract concepts through these technologies (Moore et al. 2014; Peng and Jimenez 2019; Langbeheim and Levy 2016). However, considering majority of students at each of the campuses reported that the physical chemistry teaching methods were appropriate, this may not have been an issue. However, as the Faculties of Science of Technology look to improve the quality of instruction, this may be an area in which they should first look.

At the Mona campus, students were taught using PowerPoint slides which were accessible on an e-learning page for later perusal. These notes were accompanied by real-life examples, scenarios and illustrations of how lab equipment and natural processes work. Students seemed very engaged in the Mona environment. This authentic experience would have resulted in the students receiving a rich learning experience and explains why all the views associated with teaching/learning complementarity were positive. Added to this, the positive class experience provided an explanation for why most students at the Mona campus had positive perceptions towards the appropriateness of the teaching methods and towards physical chemistry.

At St. Augustine, PowerPoint slides were also used and like Mona were accessible on an e-learning platform. They also had graphical representations as well as examples, however, students were not as engaged in these classes as at the Mona campus. Recalling the observers' perspective, through the observer's reflective journal excerpt below, it was clear that the St. Augustine students were bored in the class.

...Most of the time was spent reading from the slides. But she does write on the board to explain so that's good. I really can't blame the students. I can see they don't want to come, and why they would just leave after registration. They may have

asked themselves on many occasions, "Why stay in class, when I am capable of reading the slides myself, especially if the slides which include all the examples will be posted on the e-learning platform?" – Observer

Thus, the motivation for being in the class for many seemed to ensure that they fulfilled the UWI stipulation of attending at least 80% of course classes. Therefore, it was foreseeable that St. Augustine cohort perceptions and views comprised of mostly negative perceptions than that of the Mona cohort. We believe that the way in which the course was taught contributed to this. Even though good examples and explanations were given during class, the "chalk and talk" method seemed to drain the class of engagement, causing students to mentally tune out or physically leave the room. Onger (2017) agrees that the age-old tradition of "chalk and talk lecture methods" serves its purpose when teaching large roles of students, however, urges higher education instructors to adopt multiple-method teaching techniques. The use of multiple-method teaching has been shown to increase student engagement, enhance long-term retention of content and result in more positive perceptions towards the course content (Onger 2017).

Lastly, Cave Hill's classroom environment was one where there were good explanations, with good examples directly related to the theoretical concepts, however, there were not many real-life examples given. In addition, the lecturer taught by writing the notes on board while students copied them down. The students were visibly upset when the lecturer erased the board to continue the note writing, since they were not finished copying the notes. Consider the following excerpt from the observer's reflective journal.

I feel so frustrated in here. The students are miserable because he is writing and erasing quickly. I get the sense that they can't keep up. I feel frustrated for them, for him, for me... I'm ready to leave. – Observer

From the lecturer's viewpoint, he was most likely moving quickly because he was trying to cover as much material as possible and in order for him to move on, he needed to physically erase what was written before. Therefore, time for explanations was forfeited for the time that needed to be taken to scribe the notes. Here is the stark difference between this campus and the others where in those cases, the time for explanation could occur during the class since the notes are previously provided. While the students in the class are laser focussed on getting the notes written into their books since, they only have a short time frame (the size of the board) to get the notes before they dematerialize forever.

Hence, there is no time for thinking or listening to any explanations given. Added to this, students are now more concerned with ensuring that what they have written is accurate, thus questions on clarification of the written notes were more prevalent than on the concepts that are being taught. The environment was one of frustration which constituted a poor classroom climate for teaching and learning process to be carried out. The Cave Hill cohort, like St. Augustine, could help alleviate this type of environment if the instructional methods are changed.

The best classroom climate which facilitated the teaching and learning process the most effectively was Mona while the poorest classroom climate would have been found at Cave Hill. Classroom environments, which encompassed the teaching of physical chemistry seem to provide a plausible explanation for the statistically significant differences found between the students' perception at each campus.

Conclusion

The findings of this mixed methods study have helped address the paucity of research as it relates to the perceptions of Caribbean students towards physical chemistry content and provided insight on some of the methods that are effective for teaching the abstract and theoretical content. Following the integration of the data, Mona campus saw the best perceptions and classroom climate while Cave Hill cohort endured the worst. In addition, the almost 60–40 split of positive and negative perceptions at St. Augustine and the high percentage of negative perceptions towards physical chemistry at Cave Hill, indicates that more may need to be done to facilitate student support in the content area at these two campuses. In addition, the study further solidified the influence of the appropriateness of teaching methods and lecturer support on the perceptions that students will possess towards physical chemistry, however, presented in a way that had not been previously seen in literature. Further, it highlighted the potential influence these factors would have on student achievement. Therefore, the use real-life examples, worked problem-solving examples and taking the time to answer student questions will influence the ability for the students to digest the abstract nature of the concepts. This will aid lecturers in maintaining student engagement, increasing understanding and reap more positive perceptions of physical chemistry and likely, the overall achievement. Additionally, the findings indicated that a pre-exposure to advanced level mathematics including topics such as integration and differentiation is required to grapple with the content in this

course of study. However, diligent and bright students may be able to conquer the mathematics required in a self-taught manner, perhaps with the use of YouTube videos, mathematics apps or textbooks. Hence, providing themselves with a coping mechanism to get through the physical chemistry course.

Upon reflection, the mixed methodology used in this study was effective in its intended use – to enhance validity and credibility of the inferences made, facilitate comprehensiveness of the findings and to gather more insightful understandings of the phenomena under study. The quantitative portion facilitated the ability to make generalizations and provided information on variable effects and relationships. The qualitative portion which utilized a phenomenological design allowed us to engage in deep exploration of the varying viewpoints which existed within the context of student perceptions in physical chemistry, further exemplified by the use of observer's reflective journals and vignettes. We believe the use of the vignette, reflective journal excerpts, in tandem with interview responses offered an advantage in this qualitative research by situating the reader as well as to increase the researcher's sensitivity of analysis (Skilling and Stylianides 2019). In addition, the advantage of being immersed in the study facilitated a more holistic view on the phenomenon under exploration by comparing student interview responses to what was observed.

Future work should include an exploration of student understandings as it relates to particular physical chemistry concepts to illuminate the conceptual understanding/difficulties within the content area. This would facilitate the unearthing of the possible presence of alternative conceptions and these may have an impact on conceptual difficulties that students face, since their presence will weaken the foundation for the future learning of the concepts of physical chemistry (Ayyildiz and Tarhan, 2017). Another avenue for future work should be an exploration of the link between the mathematical nature of physical chemistry and student achievement in and perception towards physical chemistry. Owing to the qualitative portion of this study reveals varying views of students in the Cave Hill cohort, where those who previously did A-level mathematics seemed to be more comfortable with the physical chemistry concepts, while those who did not, were more concerned with the fact that they did not have the previous experience. This study has illuminated that there may very well be an interplay of factors that cause physical chemistry to be conceptually difficult, thus only after we have explored these factors on a regional scale, can measures be put in place to intervene.

Recommendations

Just as science has advanced over the years, so too has the discipline of physical chemistry matured. The discipline has moved from its limited scope of providing descriptions of observable changes in states of matter, colour and temperature as the only observable evidence for reactions. Now, we no longer have to rely on mathematical postulates to describe phenomena, but we can generate models which can help visualise and explain the behaviour of atoms and molecules. Therefore, science educators must graduate our teaching to more context-based strategies which utilize technologies such as animations and simulations, especially when dealing with such abstract concepts. Therefore, our recommendations are as follows:

1. The complex abstract nature of physical chemistry concepts requires teaching which requires more class time to be spent on the application of the concepts and the problem-solving or critical thinking aspect of physical chemistry. Further, a more collaborative environment can facilitate a more authentic learning experience and understanding of the content. Thus, we suggest that even if the lecture method must be retained due to exorbitant registration numbers, the lecture notes should be provided before the lectures on the e-learning pages and a mixture of modern teaching strategies be incorporated into the current teaching practices. These strategies can include POGIL and flipped classroom techniques embedded with problem- or inquiry-based strategies (Luker et al. 2015; Rossi 2015; Seery 2015; Spencer and Moog 2008; Trogden 2015). This should aid in focussing the time spent during class on context-rich scenarios.
2. As previously stated, simulations and animations can be useful in student visualization of abstract concepts (Moore et al. 2014; Peng and Jimenez 2019; Langbeheim and Levy 2016). These technological tools can be utilized in class or added to the e-learning pages for students to view and engage with in their free time as they grapple with these concepts. For instance, through team and independently published research (Perkins 2020), The University of Colorado has created, tested the effectiveness and provided PhET Interactive Simulations geared to science and mathematics learning, free to access for both educators and students across the world. Further, we encourage our Faculties of Science and Technologies and our Centres for Excellence

in Teaching and Learning (CETLs) to collaborate to create our own technological teaching aids which will be contextually and culturally specific. We also encourage students to take responsibility for their own learning by seeking out resources to help them with their own deficiencies.

3. On a similar note, the learning of abstract physical chemistry concepts can be enhanced by the inclusion of systems thinking approaches. Even though this is still fairly young within the chemistry education context there is great potential in using these approaches to supplement modern teaching strategies (Orgill et al. 2019), with the use of technologies such as animations to further concretize concepts (Talanquer 2019; Orgill et al. 2019; York et al. 2019). Hence, a systems-thinking approach may require the instructor to present a context-based research scenario in which students have the opportunity to consider a real-life situation. For example, an environmental hazard where there is a chemical spill in the ocean. Students may be asked to investigate the environmental impact from a marine biological perspective – environmental chemistry, as well as the physical chemistry context where the student may be asked to investigate the quantities of products/contaminants that will form in the water (environmental-analytical chemistry), how fast the reactions will take place (kinetics), the feasibility of the types of reactions (thermodynamics; entropy). Therefore, this context-based case shows the interconnections between different aspects and concepts within chemistry and connects the abstract concepts to a more concrete situation. This has the potential to aid students' ability to understand concepts holistically and individually.
4. Finally, it was clear from this study that previous mathematics experience played a role in students' perception, which will most likely influence their achievement in physical chemistry. A compulsory mathematics course geared towards the mathematical techniques required for chemistry should be instituted at the Cave Hill campus to aid students in gaining the skills that they require to grasp physical chemistry. If limited resources make the chances for instituting a mathematics course quite bleak, a scaffolding process must be executed within the current physical chemistry course at Cave Hill and given adequate time. Perhaps, the physical chemistry instructor can utilize one hour per week, for the first half of the semester with the sole purpose of teaching calculus and its application to chemistry. Failing this, students should be required to take a CAPE mathematics

course or equivalent (preliminary mathematics) as a prerequisite for the chemistry program at the university if they have not taken CAPE level mathematics or the equivalent.

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THESIS ABSTRACT

An Evaluation of the Instructional System for Primary Mathematics Teachers in Selected Teachers' Colleges in Jamaica

Avalloy L. McCarthy- Curvin

An evaluation was done to examine the instructional system that is being used in five Teachers' Colleges in Jamaica to prepare teachers of mathematics in primary schools. The evaluation was influenced by research findings which showed that at the end of preparation teachers in the primary schools in Jamaica do not demonstrate the expected conceptual knowledge and pedagogical content knowledge of the mathematics content they teach. The components of the instructional system (written curriculum, delivery of the courses, teaching practicum and the assessments) and the interaction among these components of the instructional system were evaluated using an Illuminative Evaluation Approach to identify any issues within the instructional system that might account for the outcome of teacher preparation. Embedded within the Illuminative Evaluative Approach was a Convergent Mixed Methods design. Both quantitative and qualitative data were collected and analysed and merged at the data interpretation phase of the evaluation. The findings show that while the written curriculum is designed to enable pre-service teachers to develop conceptual knowledge of mathematics, there is a mal-alignment between the focus of the written curriculum, the pedagogy and assessment used in the teacher education programme. The findings further revealed that little attention was given to the development of pedagogical content knowledge both in the written and the practiced curriculum. Ultimately, the variances that explained the outcome of teacher preparation for primary school teachers were gaps in teacher educators' knowledge of mathematics content, mathematics education and teacher education. A model for teacher preparation is put forward that includes the deliberate design of methodology courses to enable greater engagement of pre-service teachers in activities which promote their development as mathematics teachers, the use of formative assessment strategies which focus on conceptual understanding, content knowledge and the development of pedagogical content knowledge; instructional approaches which include explicit modelling pedagogy, concept development and the use of a variety of strategies to support effective teaching of mathematics and teaching practice which places emphasis on mentoring and the strengthening of pedagogical content knowledge.

Keywords: Conceptual Knowledge; Pedagogical Content Knowledge; Teacher Educators; Teacher Preparation; Mathematics; Education.

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THESIS ABSTRACT

Mixed Methods Inquiry into Belizean Teachers' and Principals' Perceptions of Teacher Supervision and the Influence of an Adapted Teacher Supervision Model on Primary Teachers' Instructional Practices

Thisbe Leticia Lucas Usher

Primary school students' poor performance on the annual Primary School Exam, continues to be a concern to education stakeholders in Belize. This Mixed Methods Multiple Case Study with Explanatory Sequential Component design first investigated 240 teachers' and 23 principals' perceptions of teacher supervision practices in Belize in 2015 using a cross-sectional quantitative survey. The survey was followed by focus group interviews with 36 randomly selected teachers and individual interviews with 6 randomly selected principals. These data were then used as the backdrop against which to gain a deeper understanding of clinical supervision through a multiple case study in the 3 schools of the 3 principals' and 6 teachers' perceptions of the influence of an Adapted Teacher Supervision Model (ATSM) on teachers' instructional practices. Descriptive statistics were used to analyse the survey data while In-vivo and Descriptive Coding, then theming were used to analyse the qualitative data. Within and Cross-Case Analyses methods were used to analyse the data from the case studies. The current supervision practices were Clinical Supervision, Walk-throughs and Spot Checks. Teachers and principals shared mostly similar perceptions on the current practices such as it ensures that the content taught in the classrooms is consistent with those of the National Comprehensive Curricula. They also had a few differing views such as "Sometimes these practices are seen as threats, to determine who gets their increment or not". Teachers and principals in the case study schools agreed that the ATSM had positive influences on teachers' instructional practice. This finding concurred with that of the literature. Recommendations are for the Ministry of Education in Belize to adopt a comprehensive framework and mandate its use by principals and teachers during lesson observations and that continuous training sessions on effective supervision practices are available for principals in Belize.

Keywords: teacher supervision practices; teachers' perception; principals' perceptions; structured supervision model.