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FROM THE EDITORS

The selected articles of this issue of Educational Planning deal mostly with technology issues both in higher education planning and K-12 education planning. In higher education, planning for online teaching is explored. In K-12 schools, cyber security, cartoon impact on student behaviors, and classroom environment designs are discussed. A unique article in this issue also covers teachers' performance-based payment in Jamaica.

First, Pourreau and Lokey-Vega's article is the report of their qualitative case study to examine professional educators' beliefs and perceptions about K-12 online teaching endorsement (OTE) practices in the State of Georgia. Findings highlighted issues with current Georgia K-12 OTE standards that teacher educators and virtual education practitioners perceive as training issues and barriers to success for virtual instructors.

Then, Richardson, Lemoine, Stephens and Waller claim that human factor is the underlying reason why many attacks on school computers and systems are successful because the uneducated computer user is the weakest link targeted by cyber criminals using social engineering. They urge that formal cyber security awareness is required to mitigate the exploitation of human vulnerabilities by computer hackers and attackers.

The third article of this issue written by Sopekan, Alade and Ignatius-Ihejirika examines the influence of cartoons on Nigerian children's social behavior from the perspective of parents. The findings show that most children watched cartoons on daily and weekly basis; most of them watched violent cartoons where there were lots of fights, hero violence, and shouting and abused characters. Parent perceptions on the influence of violent cartoon on children behavior was found to be neutral. They recommend that training programs should be organized for parents and guardians by the government and organizations on the influence of media on children social behavior and development.

Duncanson and Curry demonstrate in their article how tradespace exploration (TSE), an analytical methodology used by NASA and the DoD to design spacecraft and other complex systems, can be applied to the design of classrooms. The case study described in this paper indicates how this approach could be applied to enable decision-makers to identify a more effective allocation of resources or determine when changes in total investment are likely to have a significant impact on desired performance.

The last article in this issue written by Thompson and Samuels-Lee examines the perspectives of Jamaican teachers on performance-based evaluation as a mode of compensation for Jamaican teachers. The study found, among other things, that approximately two-thirds of teachers agree or strongly agree that the performance of teachers and schools can be objectively evaluated. However, only approximately one-third held the view that the performance of the school could be the subject of performance-based compensation.

Many articles selected for publication in this issue have pointed to the fact that innovative approaches could offer alternative measures in dealing with the educational planning processes. Some of these innovations may have definite benefits and at the same time stimulate concerns that must be handled seriously. On the other hand, political, cultural and economic differences among countries could cause some commonly workable approaches in one country to be problematic in another. Consideration has to be given to the particular contexts of a country in deciding on the implementation of planning approaches in the country.

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April, 2020

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PERCEPTIONS OF K-12 ONLINE TEACHING ENDORSEMENT PROGRAM EFFECTIVENESS IN GEORGIA: A CASE STUDY

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ABSTRACT

This qualitative case study examined professional educators' beliefs and perceptions about K-12 online teaching endorsement (OTE) practices in the State of Georgia. The authors collected data from six one-on-one semi-structured interviews and the Georgia OTE Program standards (505-3-.95) as set forth by the Georgia Professional Standards Commission. Analysis showed that the issues and concerns participants shared about current K-12 OTE preparation practices reflected real problems and challenges related to a lack of customized virtual instructor training, educator perceptions or misconceptions about online instruction and technology knowledge, and virtual setting imperfections. Findings highlighted issues with current Georgia K-12 OTE standards that teacher educators and virtual education practitioners perceive as training issues and barriers to success for virtual instructors.

INTRODUCTION

Certification dilemmas exist for today's K-12 online teaching endorsement candidates as many of them were trained solely as traditional or face-to-face (f2f) instructors, and most states do not require virtual instruction certification. The Council for Accreditation of Education Preparation, known as CAEP, requires teacher preparation programs in Georgia to prepare candidates to show mastery in technology standards; however, this requirement does not aim to specifically prepare or certify K-12 teacher for careers as virtual or online instructors. Literature in the field of K-12 online learning includes research that has examined teacher demographics and experiences (Archambault & Crippen, 2009), state education agency struggles with regulating the rapid growth of online learning options through for-profit and nonprofit organizations (Natale & Cook, 2012), student expectations for teachers in virtual school environments (Oliver et al., 2009), and how to provide evidence of identifiable learning outcomes as a measure of the effectiveness of technology in schools (Schrum et al., 2007). Little is known about the characteristics of K-12 online instructors, particularly their professional preparation, the effectiveness of different types of professional development they receive, and how they may or may not differ from teachers in traditional settings.

LITERATURE REVIEW

Changes in teacher preparation procedures across the United States including the addition of Common Core Standards in the 2000s and a strong entrance by online schooling options in K-12 public education settings have presented new instructional and learning challenges for teachers and students alike. Facing these challenges requires identifying and addressing the new instructional preparation that online teaching endorsement (OTE) candidates need so that they are capable candidates for hire in K-12 virtual settings (Archambault & Crippen, 2009; Bawane & Spector, 2009; Corry & Stella, 2012; Davis & Roblyer, 2005; DiPietro, 2010; Dykman & Davis, 2008; Kennedy, Cavanaugh, & Dawson, 2013; Schrum, Burbank, & Capps, 2007). Online K-12 education has become a ubiquitous and accepted form of 21st century schooling in many states (Hathaway & Norton, 2012; Jorrín-Abellán & Stake, 2009), but the United States lacks a single, nationalized, top-

down educational system with parity across all 50 states for traditional or face-to-face education and online education alike.

Numerous studies to date have substantiated the claim that K-12 virtual school enrollment continues to grow across the United States (Ferdig, Cavanaugh, DiPietro, Black, & Dawson, 2009; Larson & Archambault, 2015; Watson, Pape, Murin, Gemin, & Vashaw, 2014). Many researchers have examined the strengths and weaknesses of professional development endeavors for college and university faculty teaching online; however, literature that investigates professional development for K-12 settings remains limited (Archambault, Kennedy, Shelton, Dalal, McAllister, & Huyett, 2016; Corry & Stella, 2012; DiPietro, 2010; McAllister & Graham, 2016; Moore-Adams, Jones, & Cohen, 2016; Pineda Hoyos & Tamayo Cano, 2016; Rice, 2006).

Literature has established that K-12 virtual instruction places high demands on instructors. They must incorporate dynamic instructional repertoires grounded in face-to-face values and foundational practices whose implementation varies by model (i.e., online, blended/hybrid, or web-facilitated) and depends on the academic needs and ethnic, linguistic, and socioeconomic diversity of its learners (Archambault & Crippen, 2009; Natale & Cook, 2012; Oliver et al., 2009; Schrum et al., 2007). Archambault and Crippen (2009), Natale and Cook (2012), Oliver et al. (2009), and Schrum et al. (2007) identified other elements critical to K-12 virtual instruction environments: good communication and classroom organization skills, distance-learning specific verbal and nonverbal presentation skills, collaboration aimed at producing effective courses, the ability to involve and coordinate student activities among several sites, and incorporating various traditional instructor roles common to K-12 online schools. Researchers have examined different elements of virtual instruction including the transfer face-to-face pedagogical principles and practices to the K-12 online environment (Barbour, Siko, Gross, & Waddell, 2012; Hewett & Powers, 2007; Larson & Archambault, 2015; NCATE, 2008; Zimpher & Howey, 2013), curriculum requirements for K-12 online teaching endorsements (McAllister & Graham, 2016), pre-service teacher training for online instruction (Luo, Alexander, & Crompton, 2017; Luo, Hibbard, Franklin, & Moore, 2017; Williams & Casale, 2014), and training while teaching online (Zweig & Stafford, 2016), but no study to date has examined specifically perceptions of program design and to what degree candidates emerge from programs ready to teach online.

RESEARCH PURPOSE AND QUESTIONS

This case study served to examine the perceptions and beliefs held by University System of Georgia teacher educators, K-12 virtual school administrators and K-12 virtual school instructors in the state of Georgia about the effectiveness of K-12 OTE candidate preparation practices. The study specifically sought to identify the beliefs and perceptions that these three types of educators believed or perceived as the necessary or desired knowledge, skills, and dispositions of the ideal virtual K-12 instructor. The study explored these beliefs and perceptions by asking the following questions:

1. What do teacher educators in the state of Georgia believe or perceive as the necessary or desired knowledge, skills, and dispositions of the ideal K-12 instructor?
2. What do K-12 virtual school administrators in the state of Georgia believe or perceive as the necessary or desired knowledge, skills, and dispositions of the ideal K-12 instructor?
3. What do K-12 virtual educators in the state of Georgia believe or perceive as the necessary or desired knowledge, skills, and dispositions of the ideal K-12 instructor?

METHODS

Context

The literature consulted for this study showed that different online teaching endorsement (OTE) practices are at work across the state of Georgia that make a difference in how K-12 OTE candidates are prepared to become virtual instructors. There are University System of Georgia (USG) institutions, whose programs adhere to CAEP standards (CAEP, 2013), but different non-USG institutions including Georgia Regional Educational Service Agencies (RESAs), local school systems, and other organizations in the state operate under the auspices of the Georgia Professional Standards Commission (GaPSC). This study did not include the non-USG institutions and their programs since these agencies fall outside of the case boundaries.

Initial examination of the GaPSC codes and standards governing OTE shows Georgia certified K-12 teachers can choose from five K-12 OTE programs to earn this endorsement. With completion of one of these programs the GaPSC deems them effectively prepared and ready to teach online in any K-12 virtual setting in the state of Georgia (GaPSC, 2014a; 2014b; 2014c; 2014d; 2014e). In reviewing these five USG programs, evidence revealed that curricular differences exist. Some institutions required more or fewer courses than others, and slight to significant differences among programs were apparent in the courses required and how these courses were designed (GaDOE, 2015; GaPSC, 2014a, 2014b, 2014c, 2014d, 2014e; Georgia General Assembly, 2012; GeorgiaGov, 2015). Key differences among programs occurred in the course names, the course descriptions, the course assignments and assessments, and, at times, in the number of courses required toward earning OTE. In contrast, program similarities shared two traits including the key concepts and the practical applications as dictated by state codes, and the professional teaching standards that stipulated how these programs build candidates' core knowledge. The faculty responsible for OTE candidate training at each USG institution develop the courses within the programs. This study assumed that the potential for differences in OTE training practices stemmed from contextual differences among the different USG institutions. The faculty who coordinate, design, and teach OTE courses at each institution all differ in the training they received and how they perceive and interpret the different Georgia codes and GaPSC guidelines and standards (GaPSC 2014a; 2014b; 2014c; 2014d; 2014e). These differences produce different USG and GaPSC approved programs, each having a unique structure and, to a degree, its own unique course offerings for OTE candidates.

This qualitative case study was designed to examine the beliefs and perceptions held by different types of educators in the state of Georgia about K-12 virtual instructor preparation practices. Subsequently, the study compared these beliefs and perceptions to the current Georgia K-12 OTE standards to determine parity and divergence between the standards and current perceptions about K-12 virtual instructor preparation practices. The study was framed by constructivism (Stake, 1995; Yazan, 2015), elements of phenomenology (Creswell, 2006; Moran, 2000), existing emerging literature about educational practices and identity as related to K-12 OTE candidate preparation, and triangulation of data for analysis. This publication is one component of a larger dissertation study conducted in 2016 (Pourreau, 2016).

Participants

This study's participants included three USG teacher educators, one Georgia K-12 virtual school administrator, and two Georgia K-12 virtual instructors. The USG teacher educators in this study came from different USG institutions across the state who offer OTE as a part of their post-graduate certification programs. All three USG teacher educators and the K-12 virtual administrator hold terminal degrees from major research institutions in the United States but in different fields.

One USG teacher educator holds a Ph.D. in Instructional Technology, another holds a Ph.D. in Instructional Design and Technology, and the other holds an Ed.D. in School Improvement. Both of the teacher educators with terminal degrees in instructional technology fields direct the K-12 OTE program in their respective colleges of education based on their specialized knowledge about Georgia K-12 OTE program preparation practices and purposes. Both have at least two years of prior experience as K-12 teachers and both have trained Georgia K-12 instructors in virtual and face-to-face settings. The K-12 OTE programs at both of their institutions are fully online. One has been training K-12 OTE candidates via online means only for three years; the other, for five years. The other USG teacher educator also instructs Georgia K-12 teachers, but mostly in face-to-face settings. While this teacher educator's USG institution offers online courses, it did not offer the K-12 OTE endorsement.

The K-12 virtual school administrator and the K-12 virtual instructors came from K-12 virtual schools based in the state of Georgia. The K-12 virtual school administrator held a Ph.D. in Curriculum and Instruction and directly supervises K-12 virtual instructors. One K-12 virtual instructor held both a Bachelor's of Science degree and a Master's of Science degree in English Education from major research institutions in the United States and recently moved from a position as a K-12 virtual instructor to one as a Coordinator of Course Development at a K-12 virtual school. The other virtual instructor, also a graduate of a major research institution in the United States, held a Bachelor's of Science degree in Math Education and a Master's of Science degree in Educational Leadership and recently moved from a position as a K-12 virtual instructor to one as a Testing Coordinator. Both of the virtual instructors taught for an average of five years in a traditional K-12 face-to-face environment in a Georgia public school system before becoming virtual instructors, and each of them spent four years working as full-time faculty in a K-12 virtual school prior to changing positions.

Data Collection

Purposive sampling method was used to ensure that the study included only participants with the potential to yield information relevant to the research purpose and questions. Online searches for USG institutions offering K-12 OTE through their respective colleges and for actively operating K-12 virtual schools in the State of Georgia helped determine participant eligibility. A second and more extensive search of USG college websites and K-12 virtual school websites produced the names of faculty who fit the criteria for this study. Following IRB approval, ten potential participants received an email with details about the study and an invitation to participate. Invitation respondents then received the study cover letter, the IRB-approved study consent form, and a copy of the interview questions via email. Of the ten invited participants, six of them (60%) (three USG teacher educators, one K-12 virtual school administrator, and two K-12 virtual instructors) self-selected by responding to the invitation and consenting to participate in the interview process. Interviews with these six participants were scheduled via email upon receipt of their signed consent form.

This study employed an interview protocol consisting of open-ended questions coupled with inductive and deductive inquiry. All interviews were conducted one-on-one over the phone and were held at the convenience of the participants. All interviews were recorded in a digital audio-only format using a voice-only recording app housed on a university-owned electronic tablet. All participants responded to the same open-ended questions about their perceptions and beliefs about K-12 OTE preparation practices in Georgia as related to the knowledge, skills, and dispositions (i.e., attitudes or beliefs) that a K-12 OTE candidate needs to work in a K-12 online classroom in the State of Georgia. The use of open-ended questions permitted inquiry about issues in greater depth

and afforded the researchers the flexibility of using probing or follow-up questions to facilitate more meaningful or reflective answers from participants (Simons, 2009; Yin, 2011). The voice-only recordings were erased from the university-owned electronic tablet upon transfer to a password-protected flash drive. When not in use, all interview recordings, interview transcriptions and data were encrypted and stored securely on a password protected flash drive that was locked in a university office as approved by the institution's IRB. All recordings were subsequently deleted in accordance with the conditions of the IRB.

Data Analysis

After all interviews were transcribed, the transcriptions were coded thematically using constant comparative analysis (Boeije, 2002; Glaser, 1965) to determine response alignment among same-group participants, across participant groups, and between the body of participant responses and the current Georgia K-12 OTE standards. To do this, all themes that emerged from the interviews were coded axially to identify related themes that could be collapsed for same or similar themes or concepts. Thematic coding allowed the authors to examine and manage information in a gradual process while working to safeguard against researcher inferences and suppositions with the potential to influence coding outcomes and study results (Simons, 2009; Stake, 1995). The authors then employed inductive and deductive analysis (Stake, 1995; 2005) coupled with coding comparisons across interviewee groups to analyze interview responses for commonalities and differences in the beliefs and perceptions across the three participant groups (USG K-12 teacher educators, K-12 virtual school administrators, and K-12 virtual instructors). The cross-coding results then were compared to each other to establish themes and content related to all of the educator responses in this study that support and challenge current K-12 OTE practices in the state of Georgia.

The next step was to determine how well the current state K-12 OTE standards align with current beliefs and perceptions about knowledge, skills and dispositions deemed necessary for successful K-12 virtual instructor on-the-job performance. The themes in Table 1 first were grouped into one of the four thematic categories including "K-12 Virtual Instructor Training and Dynamics", "K-12 Virtual Instructor Knowledge", "K-12 Virtual Instructor Knowledge and Skills Integration", and "K-12 Virtual Instructor Dispositions". Then the themes were compared to wording in the current Georgia K-12 OTE standards for explicit emergence from the current Georgia K-12 OTE standards based on wording that corresponded explicitly, implicitly, or not at all to participants' beliefs and perceptions. Findings from this last stage of comparison were used to draw connections between participants' self-reported perceptions and beliefs to current research findings and recommendations in the field. The results of this comparison served to drive discussion about current K-12 OTE program preparation trends and making recommendations for future research endeavors in this field.

FINDINGS

The beliefs and perceptions held by participants generated 25 overarching themes related to the knowledge, skills, and dispositions that they collectively deemed essential for K-12 virtual instructors. These themes appear below in Table 1.

Table 1.
Interview Themes with Explicit Emergence.

Building Confidence with Technology
Instructor Perceptions about Online Instruction
Appropriate Modeling for Online Courses
K-12 Virtual Instructors Need Fluency with Technology Tool Use
Virtual Support for Students' Learning Needs
Knowing How to Integrate Technology into Teaching
Competence with Online Instruction
Know How to Instruct Online instead of Facilitating Online Learning
Establish and Improve Online Communication Skills
LMS Competence
K-12 Virtual Instructors Need Content Knowledge Mastery
K-12 Virtual Instructors Need to Know How to Integrate Technology into Teaching
Establishing and Maintaining Strong Online Instructor Presence
K-12 Virtual Instructors Need Documented Success as a Traditional/f2f Instructor
Current OTE Program Design for Three Endorsement Courses in the State of Georgia
K-12 Virtual Instructors Need Robust Content for Technology Knowledge
K-12 Virtual Instructors Need to Be Flexible and Adaptable
K-12 Instructors Need to Be Creative and Resourceful
K-12 Virtual Instructors Need to Know How Technology Works in a Virtual Environment
K-12 Virtual Instructors Need to Know How to Troubleshoot Technology Issues
Insights into K-12 Virtual Instructor Training
K-12 Virtual Instructors Need Tolerance for Imperfections
K-12 Virtual Instructors Need to Believe that Everyone Can Learn Online
K-12 Virtual Instructors Need to Embrace and Use Student-Centered Pedagogy
K-12 Virtual Instructors Need to Use Visual and Non-Visual Tools in Virtual Environments

The themes in Table 1 corresponded to one of four different categories. Three categories (*K-12 Virtual Instructor Training and Dynamics, K-12 Virtual Instructor Knowledge,* and *K-12 Virtual Instructor Knowledge and Skills Integration*) related to each of the study's three research questions. The fourth category, *K-12 Virtual Instructor Dispositions*, emerged from the study itself, resulting from the emergence of additional themes that drove and necessitated its creation.
Table 2 below shows categorically which themes from Table 1 emerged explicitly from wording in the Georgia OTE standards.

Table 2 shows that eight of the 25 overarching themes from Table 1 corresponded to explicit statements in the Georgia OTE Standards. These eight themes appear in the standards as explicitly stated criteria for K-12 preparation practices and correlate to the three theme categories based on the research questions (*K-12 Virtual Instructor Training and Dynamics, K-12 Virtual Instructor Knowledge*, and *K-12 Virtual Instructor Knowledge and Skills Integration)* plus the theme category *K-12 Virtual Instructor Dispositions* that emerged from the study. The category *K-12 Virtual Instructor Training and Dynamics* houses three themes ("Building confidence with technology", "Appropriate modeling for online courses", and "Current OTE program design"), and the category *K-12 Virtual Instructor Knowledge* houses the theme "Robust training content for

technology knowledge" plus three child themes. The other two categories each house two themes, with "LMS knowledge and competence" plus several child themes and "Be creative and resourceful" falling under *K-12 Virtual Instructor Knowledge and Skills Integration*, and "Be flexible and adaptable" and "Embrace and use student-centered pedagogy" under *K-12 Virtual Instructor Dispositions*. These categories and their themes correlate to knowledge, skills, and dispositions that USG teacher educators, K-12 online practitioners, and the Georgia OTE Standards commonly identified as necessary for K-12 virtual instructor success:

- Knowledge about and competence with a Learning Management System
- Knowledge about how technology works in a virtual environment
- Knowledge about how to integrate technology into teaching
- Creativity and resourcefulness
- Knowledge based on robust technology training content
- Knowledge that reflects content area mastery.

Table 2.
Beliefs and Perceptions about K-12 Virtual Instructor Knowledge, Skills and Dispositions That Emerged Explicitly from the Georgia OTE Standards

Belief and Perception Themes by Category
K-12 Virtual Instructor Training and Dynamics
Building confidence with technology
Appropriate modeling for online courses
Current OTE program design content for three courses
K-12 Virtual Instructor Knowledge
Robust training content for technology knowledge:
Good OTE preparation from USG programs
OTE program practice opportunities must mirror reality
OTE candidates need positive technology
K-12 Virtual Instructor Knowledge and Skills Integration
LMS knowledge and competence:
Know how technology works in a virtual environment
Know how to integrate technology into teaching
Know how to troubleshoot technology issues
Know how to instruct online instead of facilitate online learning
Establish and maintain a strong online instructor presence
Fluency with technology tool use
Provide virtual support for students' learning needs
Use visual and non-visual technology tools in virtual environments
Be creative and resourceful
K-12 Virtual Instructor Dispositions
Be flexible and adaptable
Embrace and use student-centered pedagogy

The explicit emergence of these themes from the standards also shows that the creators of the standards, USG teacher educators, and Georgia virtual education practitioners alike view them as essential components of Georgia's K-12 OTE preparation practices. Conversely, there are themes that did not emerge from the standards despite substantiated emergence from the interviews and document analyses. This was the case for three different themes from Table 1. One theme, "Current OTE program design for three endorsement courses in the state of Georgia", emerged explicitly across all interviews and the GaPSC OTE Standards. At the time of this study, the state of Georgia required teachers seeking K-12 online teaching endorsement to complete three courses to add the Online Teaching Endorsement to their Georgia teaching certificate. Its three child themes, however, did not emerge at all from the state standards. They are:

- K-12 instructional designers need their own OTE standards
- K-12 virtual instructor trainers need their own OTE standards
- K-12 virtual instructors need their own OTE standards

The explicit emergence of the parent theme "Current OTE program design for three endorsement courses in the state of Georgia", which stems from the category *K-12 Virtual Instructor Training and Dynamics* in Table 2, correlates directly to statements from all interview participants that described their professional experiences either as virtual instructor trainers or as virtual instructors in-training. The theme "Instructor Perceptions about Online Instruction" and its three child themes ("Online instruction misconceptions", "Technology misconceptions", and "Technology knowledge and expertise") as well as the theme "Be tolerant of imperfection" emerged explicitly from all interviews but did not emerge at all from the state standards. The absence of these three parent themes and three of the child themes from the GaPSC OTE Standards provides evidence that these three themes in particular, at least from the perspective of the standards creators, have not yet arisen as K-12 virtual instructor preparation concerns that the Georgia standards need to address explicitly.

DISCUSSION

The findings presented in this study indicated that current K-12 OTE preparation practices in the State of Georgia align well with participants' beliefs and perceptions of what constitutes appropriate K-12 OTE candidate preparation. Analysis of participant feedback also identified three themes that correspond to issues or areas of concern expressed by all participants:

- The need for OTE program design to include training based on standards specific to three different professional capacities in virtual education (instructional designer, educator trainers, and virtual instructors)
- The need to address K-12 OTE candidate perceptions about online instruction (this includes misconceptions about online instruction, technology, technology knowledge, and technology expertise)
- The need for K-12 virtual instructors to be tolerant of imperfections that arise in virtual settings.

These themes did not emerge from thematic coding of the current Georgia standards nor did they align with any of the wording in the standards. The program documents and policy statements consulted for this study showed that the GaPSC OTE Standards drive K-12 OTE program design. The data revealed that standards in Georgia did not prescribe K-12 OTE preparation practices that differentiate among instructional designers, educator trainers, and virtual instructors; a reading the GaPSC OTE Standards confirmed their absence. Their absence from the standards in this study lends credence to the study design: the lack of emergence of any one theme implies the absence

in reality of a practice or idea to which that theme is connected. This study revealed an absence of the themes "K-12 virtual [instructors] need to be tolerant of imperfections" and "Perceptions about online instruction" and the three child themes "Online instruction misconceptions", "Technology misconceptions", and "Technology knowledge and expertise" from within the Georgia OTE Standards.

By identifying requirements as a part of K-12 OTE preparation practices in the State of Georgia, the results of this study succeed in identifying a void in K-12 OTE preparation practices that all participants in this study believe the current standards need to fill. These findings reflect those of Shepherd, Bollinger, Dousay and Persichitte (2016). In that study, the authors created new virtual education courses working in conjunction with the State of Wyoming's department of education. Courses offered in the State of Wyoming prior to the study mirrored those here in Georgia in that both states had utilized a one-size-fits-all course design approaches. The authors' newly designed courses in Wyoming echoed the sentiments of participants in this study in that instructors believe in moving beyond a one-size-fits-all design to one that prepares K-12 virtual instructors for the realities and multiple roles associated with working in K-12 virtual environments.

RECOMMENDATIONS AND PLANNING IMPLICATIONS

With enrollment in K-12 virtual schools projected to continue to rise in the State of Georgia and in other states across the nation, conducting research similar to the present study will help identify new virtual education paradigms and challenges as they arise. Staying abreast of new developments and challenges in K-12 online learning and instruction in the State of Georgia is key. Examining these through open discussions in USG institutions of higher learning and in research similar to this study will go far in identifying and addressing new ways to develop and structure future K-12 OTE preparation practices in ways that provide timely and deeper development of K-12 virtual instructor candidates for careers in K-12 virtual education settings. Since this study was conducted, the GaPSC has rewritten the Georgia OTE standards, and a new analysis comparing the emergent themes from participant interviews with the revised standards would prove informative.

The findings from this study highlighted perceived shortcomings with Georgia's current K-12 OTE preparation practices and could serve as the rationale for conducting a study similar to that of Shepherd et al. (2016). In that study, the authors created new virtual education courses working in conjunction with the State of Wyoming's department of education. The resulting courses targeted many of the same technological and instructional challenges faced by K-12 virtual instructor candidates as highlighted by participants in this study, including communication issues (i.e., facilitating student interactions in synchronous and asynchronous delivery or supporting and engaging online learners effectively) and issues with tool implementation and use owing to a lack of mastery with design theory. One way to do this would be to include input from actively employed K-12 virtual instructors so that training procedures recognize and reflect the realities of K-12 virtual education environments.

Other recommendations for future studies include research that will expand the course offerings for preparing instructors and the administrators who will supervise them for careers in K-12 virtual settings both within the state of Georgia and potentially in other states as well. One USG teacher educator in this study stated that a Georgia K-12 virtual school administrator had once shared their frustration at being unable to find training specific to instructors in their field. This USG teacher educator said that they agree with the administrator's call for developing training that helps K-12 virtual school administrators with skill sets needed in their field. Several authors (Dexter, 2011; Leonard & Leonard, 2006; McLeod, 2011; McLeod, Bathon, & Richardson, 2011; McLeod &

Richardson, 2011) have researched this very topic. They noted that the current focus on technology as related to school leadership still remains more heavily focused on the technology tools themselves than on training school leaders to understand how to approach transforming learning environments via the use of rich and powerful technologies. While educational leadership is a different field than that of K-12 teacher preparation, these fields are at the heart of educational and instructional practices regardless of the academic setting. It is only logical to conduct research that furthers the growth and development of both where K-12 online learning environments are concerned.

LIMITATIONS

The context of this study automatically precluded that its findings would be limited to the particular beliefs, perceptions, and experiences of its participants. The small number of participants in this study also qualified as a limitation since the knowledge, beliefs and perceptions of one individual cannot be generalized at all to the entire population of K-12 virtual administrators in the same virtual school or even in the state of Georgia.

CONCLUSION

K-12 online teaching endorsement programs have existed for nearly a decade in different University System of Georgia institutions. To date, perceptions surrounding their design and to what degree candidates emerge ready to teach in an online or virtual environment have not been examined. The findings showed that taking steps to redesign the state's K-12 OTE standards using input from actively employed K-12 virtual instructors would provide insight for creating K-12 OTE standards that more accurately reflect the realities of K-12 virtual education environments.

This qualitative case study also addressed a gap in the literature. Study outcomes identified the necessary or desired knowledge, skills, and dispositions that participants believed or perceived as necessary in preparing K-12 OTE candidates to become virtual instructors in the state of Georgia. K-12 virtual instructors need training that prepares them for more than instruction in virtual settings given the high demands that virtual instruction places on them (Ferdig et al., 2009; Shepherd et al., 2016).

The findings in this study showed that K-12 OTE program design addresses instructor preparation but falls short when it comes to customization for other types of K-12 online positions such as instructional designers, educator trainers, or even virtual school administrators. The conclusion is that leaving out any one of these aspects of K-12 OTE candidate preparation will hamper the efforts of any program to prepare its candidates fully and well for a career in K-12 online teaching.

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Interview Questions for University System of Georgia Teacher Educators:

1. I am interested in knowing about your beliefs and perceptions as a teacher educator regarding K-12 teacher preparation and instruction. I also am interested in the experiences you have had preparing K-12 teacher educators to become face-to-face and virtual instructors. What types of experiences have you had preparing K-12 educators for face-to-face instruction, and what have they been like? What types of experiences have you had preparing K-12 educators for virtual instruction, and what have they been like? (Probing question if necessary: Is there anywhere else that you have worked in K-12 online education? Is there anything else that you have done?)

2. What are the particular skills that you believe a K-12 virtual teacher needs to work in an online classroom? What particular knowledge do you believe a K-12 virtual teacher needs to work in an online classroom? What particular dispositions (attitudes or beliefs) do you believe a K-12 virtual teacher needs to work in an online classroom? In which ways do you believe that the skills, knowledge, and dispositions that a K-12 virtual teacher needs for working in an online classroom differ from the ones that face-to-face K-12 teachers should have?

3. Could you please tell me about an instance where an educator trained by you and hired by a K-12 virtual school in Georgia was a success story and why? What do you believe contributed to that teacher's success?

4. Could you please tell me about an instance where an educator trained by you and hired by a K-12 virtual school in Georgia struggled or experienced challenges? What do you believe contributed to the teacher's struggles and/or challenges?

5. What else can you tell me about how your institution prepares virtual K-12 teachers? What other characteristics and skills can you think of that the program at your institution promotes?

Interview Questions for Georgia K-12 Virtual School Administrators:

1. I am interested in knowing about your beliefs and perceptions about K-12 online teacher preparation and instruction from an educational leadership perspective. I also am interested in the experiences you have had as an administrator in a K-12 online learning environment. What types of experiences have you had, and what have they been like? (Probing question if necessary: Is there anywhere else that you have worked in K-12 online education? Is there anything else that you have done?)

2. What are the particular skills that you believe a K-12 virtual teacher needs to work in an online classroom? What particular knowledge do you believe a K-12 virtual teacher needs to work in an online classroom? What particular dispositions (attitudes or beliefs) do you believe a K-12 virtual teacher needs to work in an online classroom? In which ways do you believe that the skills, knowledge, and dispositions that a K-12 virtual teacher needs for working in an online classroom differ from the ones that face-to-face K-12 teachers should have?

3. Could you please tell me about an instance where a teacher hired to work at your virtual school was a success story and why?

4. Could you please tell me about an instance where a teacher hired to work at your virtual school struggled or experienced challenges and what that was like?

5. Is there anything that you have to do post-hire to prepare virtual K-12 teachers to teach at your school? What characteristics and skills does the program at your institution promote?

Interview Questions for Georgia K-12 Virtual Educators:

1. I am interested in knowing about your beliefs and perceptions about K-12 online teacher preparation and instruction from a virtual educator perspective and the experiences you have had as an educator in a K-12 online learning environment. What types of experiences have you had, and what have they been like? (Probing question if necessary: Is there anywhere else that you have worked in K-12 online education? Is there anything else that you have done?)

2. What are the particular skills that you believe a K-12 virtual teacher needs to work in an online classroom? What particular knowledge do you believe a K-12 virtual teacher needs to work in an online classroom? What particular dispositions (attitudes or beliefs) do you believe a K-12 virtual teacher needs to work in an online classroom? In which ways do you believe that the skills, knowledge, and dispositions that a K-12 virtual teacher needs for working in an online classroom differ from the ones that face-to-face K-12 teachers should have?

3. Is there anything that you had to do post-hire to prepare for becoming a virtual instructor at your school?

4. If so, what are the characteristics and skills that this additional training promoted?

PLANNING FOR CYBER SECURITY IN SCHOOLS: THE HUMAN FACTOR

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ABSTRACT

Cybersecurity has emerged as one of the most critical issues confronting schools in the 21st century. Computer security is an essential instrument for protecting children, but K-12 schools are considered one of the most attractive targets for data privacy crimes often due to the less-than-effective cybersecurity practices in schools. The human factor is the underlying reason why many attacks on school computers and systems are successful because the uneducated computer user is the weakest link targeted by cyber criminals using social engineering. Formal cyber security awareness is required to mitigate the exploitation of human vulnerabilities by computer hackers and attackers.

INTRODUCTION

Much of the world is now in cyber space and cyber security has become a massive issue with many facets of schools (Arlitsch & Edelman, 2014). Cybersecurity has brought about research, discussion, papers, tools for monitoring, tools for management, etc., with much of the focus from the schools' side concerning the protection of their data and information (Seemma, Nandhini, & Sowmiya, 2018). As a result of increased dependence on the Internet, cybersecurity has emerged as one of the critical issues confronting schools in the 21st century (Gioe, Goodman, & Wanless, 2019). The reliance on a complex technology infrastructure has come with a price: by accepting the Internet so widely, schools have exposed themselves to a range of nefarious cyber activities by a spectrum of offenders looking for school data and information (Shen, Chen, & Su, 2017).

Governments, businesses and schools have been victims of cyber thefts, cyber-crime, and cyber disruption. Despite recent heightened attention and increased levels of security investments in cybersecurity, the number of cyber incidents, their associated costs, and their impact on people's lives continues to rise (Abomhara & Koien, 2015). As computing and communications technologies become more entrenched in the global economy and as society enters the era of the "Internet of Everything" (IoE), security compromise of these systems will rise as well (Bailaszewski, 2015).

For the early years of technology use human factors remained unexplored and unquestioned. However, the increasing cyber-attacks, data breaches, and ransomware attacks are often a result of human-enabled errors; in fact, researchers indicate that as much as 95% of all cyber incidents are human-enabled (Nobles, 2018). Cybersecurity is fundamentally a case of human and automation teaming so both the machine and human are potentially vulnerable. The research results show that

the greatest security vulnerability is the lack of the awareness of employees (Safa, Sookhak, Von Solms, Furnell, Ghani, & Herawan, 2015). While tools and technology are important, people are the most important element of a cybersecurity strategy.

WHAT IS CYBERSECURITY?

Cyber security is defined as measures taken to protect a computer or network against unauthorized access to maintain the safety and integrity of the information stored within (Aloul, 2012). Cybersecurity involves the technical interventions that protect data, identity information, and hardware from unauthorized access or harm including security of assets in cyberspace. More formally put, cyber security is defined by Craigen, Diakun-Thibault and Purse (2014) as: "the organization and collection of resources, processes, and structures used to protect specific assets in cyberspace and cyberspace-enabled systems from occurrences that misalign de jure from de facto property rights" (p. 13). Further, Seemma, Nandhini, and Sowmiya (2018) reported that "cyber security are techniques generally set forth in published materials that attempt to safeguard the cyber environment of a user or organization. It manages the set of techniques used to save the integrity of networks, programs and data from unauthorized access" (p. 25).

WHY IS CYBERSECURTIY IMPORTANT TO SCHOOLS?

Increasingly schools are repositories of large data sets that contain information valuable in a cyber marketplace. Additionally, schools have not typically expended the resources to handle cybersecurity in the same manner as government and big business (Goldsborough, 2016). Consequently, schools are a frequent target for cyberattacks because of the sensitive data their IT systems often house combined with the vulnerabilities that come with an open-access culture (Goel & Jain, 2018). Successful school cybersecurity requires communication between the IT department and institutional leaders, to be more effective in preventing attacks and bouncing back after an incident occurs. The primary data contained in school files are largely personal data which is valuable to hackers and other cyber criminals (Davis, 2018). The following is a sample list of school data stored electronically and which could be susceptible to cyber-attack.

A Partial List of Unique, Voluminous, and Valuable Data Stored by Schools

- Student ID
- Social security numbers for students, faculty and staff
- Credit card numbers for faculty, staff and school
- Immunization history and/or medical records
- Enrollment and attendance
- Special education documentation
- Names of students, faculty and staff
- Addresses
- Date of birth
- City, state and country of residence
- Bus routes
- Telephone numbers
- Email addresses
- Gender
- Race
- Criminal record
- Test scores

- Grades
- Achievements
- Free lunch applications
- Participation in school activities (dates and times)
- Family members
- Prior students at the school and their data
- Community and business involvement in school (McGettrick, 2013; Rios, 2017)

WHAT ARE THE ISSUES WITH CYBERSECURITY AND SCHOOLS?

Cyberspace has distinct advantages and disadvantages; it permits persons to work faster, more efficiently, and more effectively, but the downside of threats in cyberspace can damage the school, its reputation, and cause legal liability and financial loss (Schuesster, 2013). If there is not awareness of the potential cyber dangers, persons, product and performance could be jeopardized. Only by using a realistic and reliable cyber system can schools deal with both the opportunities and risks of cybersecurity (Whitman & Mattford, 2016). Computer security is not well regulated, and threats and vulnerabilities need real solutions, not a quick fix or a "patch and pray" effort. National leaders and computer experts warn that it is not a matter of *if*, but *when* a major cyberattack occurs (Rainie, Anderson, & Connolly 2014).

Due to the increased dependence on the Internet, cybersecurity has emerged as one of the most critical issues facing schools in the 21st century. Schools have been victims of cyber thefts, cybercrime, and cyber disruption despite recent heightened attention and increased levels of security investments in cybersecurity (Alavi, Islam, & Mouratidis, 2016). Cybersecurity threats continue to evolve and reinvent themselves, making cyber-attacks a concern for anyone utilizing technology, particularly schools (Akhtar, Azeem, & Mir, 2014). Schools have become an increasingly popular target for cyber-attacks for several reasons. Specifically, many schools lack a robust cybersecurity infrastructure capable of keeping up with the most pervasive cybersecurity threats. Furthermore, hackers perceive schools as gateways to larger opportunities given the number of persons involved at a school and the increased potential to exploit multiple venues (Katzan, 2016). The typical response from schools is to identify assets and risks, protect perilous assets, detect intrusions, respond to intrusions and recover from incidents (Chen & Shen, 2016).

For schools the currently available technology clearly provides the means for acquiring greater amounts of information with more efficiency than ever before. Data and information are more readily available and more quickly accessible today (Chen, 2014). However, the transition from an era of information scarcity to information abundance requires a re-focusing on human sense-making processes to identify threats and protect assets and people (Kyriazis, 2018).

For schools the increase of computer networks, coupled with the enlarged number of persons with access to school technology, meant a growth of digital information, which is much more difficult to protect than hard copy files and folders (Aleroud & Zhou, 2017). This makes cyber security difficult for schools because there always has to be a compromise between robustness of the security system and simplicity of the system for human use (Lestch, 2015). Additionally, the current trend is to share information, not protect it. School personnel will share their data and information on social media, visit questionable websites, and download files from the Internet that probably contain malware (Stewart & Jurjens, 2017). This increased use of and dependence on new cyberspace technologies has created new risks, particularly human factor risk. Consequently, some schools have implemented cyber-awareness programs designed to reduce the human factor risk and help secure schools (Caballero, 2017).

CYBERSECURITY RISK IN SCHOOLS

The threat of cybercrime and intrusion is dynamic and complex, and hackers now act with impunity in carrying out attacks against school targets. Cyber criminals are gaining access to schools through sophisticated spear phishing attacks, preying on the human and technical vulnerabilities in the school cybersecurity system (Arachchilage, Love, & Beznosov, 2016). Managing the risks from cyberattacks usually involves (1) removing the threat source; (2) addressing vulnerabilities in the system; and (3) lessening impacts by mitigating damage and restoring functions. However, these operations are time and labor intensive and often happen after an intrusion has happened (Sen & Borle, 2015). What is needed is a more secure system before the attacks happen.

Types of Cyber Events That Impact Schools:

- data breaches (unauthorized disclosure of personal information),
- security incidents (malicious attacks directed at a school),
- privacy violations (alleged violation of consumer privacy),
- phishing/skimming incidents (individual financial crimes),
- technology-focused threats (hacking, malware and spyware),
- content-related risks (exposure to illicit or inappropriate content),
- harassment-related threats (cyber-bullying, cyber-stalking and other forms of unwanted contact), and risk of exposing information (children exposing their personal information through phishing or sharing information on social networking platforms) (Atkinson, Furnell, & Phippen, 2009).

CYBERSECURITY ASSESSMENT

The Internet, or cyberspace, has become so attractive that its use is second nature to most persons. However, it has also made all users, including schools, more exposed and vulnerable to cyber criminals (Gupta, Tewari, Jain, & Agrawal, 2017). The risk of losing personal data or the theft of an important personal and/or organizational data makes cyber security the prime challenge faced by organizations, especially schools. Therefore, schools should be proactive in assessing potential weakness in their cybersecurity systems and developing alternatives to mitigate as much risk as possible (Kaur, 2016).

WHAT MAKES EDUCATION A PRIME TARGET FOR CYBER-CRIMINALS?

"A little over half of all digital data breaches were caused by members of the affected school community (staff, students) and 23 percent were caused by school vendors or partners. The remaining 23 percent were carried out by unknown actors. Furthermore, student data was included in more than 60 percent of the 2018 data breaches" (p. 1). Such were the conclusions reported in the "The State of K-12 Cybersecurity: 2018 Year in Review," released by the K-12 Cybersecurity Resource Center (Rock, 2019).

Personal information and social security numbers are prime targets for data breaches (Kleinberg, Reinicke, & Cummings, 2015). Many persons perceive that there is little data in schools that would be of benefit to cyber criminals, but in reality, schools have a vast store of information that is valuable on the cyber black market, including personal data. Schools have information on students and their parents that can include social security numbers, e-mail addresses, credit card numbers, financial data, and other personally identifiable information that could be stolen and sold on the black market (Coleman & Reeder, 2018). Additionally, schools have business offices that manage accounts payable that provide access to organizational financial data (Chen & Shen, 2019).

Wide Variety of Valuable Data

Schools have sensitive data about students, parents, alumni, faculty, and staff. Records are routinely retained decades after students have left an institution. Moreover, the sheer volume of potentially valuable data housed at most schools tends to make them highly attractive targets (Lestch, 2015; Rock, 2019) (see above for a listing of potentially valuable data).

Lack of Centralized Structure for Cybersecurity

Schools may house their data in many different locations rather than one centralized location. Student data may be kept separately at each school and may be aggregated centrally at a district office. Student data and financial data may be housed separately. This decentralized structure can give cybercriminals a greater opportunity to exploit vulnerabilities in the disparate systems housing sensitive data (Javidi & Sheybani, 2018).

Organizational Vulnerabilities

The decentralized nature of data storage in schools is often paralleled by similar administrative and operational problems. The responsibility for implementing and operating security measures and determining processes may reside with a number of different individuals within a variety of departments, often with a different reporting structure. Schools generally lack a top-down command structure that makes new safeguards easy to implement and improve security (Coleman & Reeder, 2018).

Prevalent Use of Personal Devices

Administrators, faculty, and staff are often unaware of the extent to which they may be exposing their institution to cyber risks when they download sensitive data to less well-protected personal devices (Ki-Aries & Failey, 2017). Approximately 90 percent of faculty own a smartphone, while just 27 percent received mandatory information security training (Hipsky & Younes, 2015). Additionally, many elementary students, and most high school students, have a cell phone, most of whom have never received security training. As a result, even if the school has robust security measures in place, any number of individuals at the institution may, through carelessness, or unintentionally through lack of awareness, expose sensitive data (Hope, 2018).

THREAT APPRAISAL: THE HUMAN ELEMENT

Threat refers to the possibility of danger and the probability of losing something of value. Threat relates to intentional interaction with uncertainty and is the person's judgment about the severity of the risk (Urias, Stout, & Lin, 2016). The human factor is the underlying reason why many cyber-attacks on computers and systems are successful (Gutzwiller, Fugate, Sawyer, & Hancock, 2015). The uneducated computer user is the weakest link targeted by computer hackers attempting to break into organizations (Aloul, 2012). In response, Da Veiga (2019) concludes that schools that implement strong technological security procedures still often pay insufficient attention to human sources of vulnerability, and strongly advocates for enhanced security training. Armerding (2014) cites a report that indicates that 56% of workers who use the Internet on their jobs receive no security training at all.

In an effort to mitigate security risks, schools use the modern solution: technology-centered security measures in isolation (Peltier, 2016). However, after unsuccessful technological efforts in isolation, such solutions proved to be insufficient to mitigate risks (Ritzman & Kahle-Piasecki, 2016) caused by the 'human vulnerabilities'. These vulnerabilities are labeled as the 'human factor'. The term human factor relates to the role(s) that users play in the security process based upon their

perceptions that can either positively or negatively impact the security process (Alhogail, Mirza, & Bakry, 2015.

Preventing information technology security incidents poses a great challenge for schools where more resources are being allocated to security programs that focus on educating and training employees in an effort to reduce human misbehavior (Luo. Brody, Seazzu, & Burd, 2011). Simply stated, cyber criminals target people, not computers, in order to create a breach in the security system. Examples of user mistakes include inappropriate information security behavior, such as using a social security number as username and/or password, writing passwords on sticky paper, sharing their username and password with colleagues, opening unknown emails and downloading their attachments, as well as downloading software from the Internet (Sawyer & Hancock, 2018).

It has been reported by many researchers that the human link is the weakest in information security. Therefore, the school must have rigid security policies and need to instruct the employees in awareness and create an information security culture (Joinson & Steen, 2018). The role of humans in information security has been a neglected area of concern; security policies have been rendered useless through negligence and lack of knowledge or concern by school managers of information data (Hadlington, 2017).

A secure school environment for data security must incorporate human aspects of information security. The lack of information security awareness, ignorance, negligence, apathy, mischief, and resistance are most often the causes of users' mistakes (Thomas, 2018). According to Kearney (2010), people can only help in preventing security breaches if they are aware of the dangers, and are taught secure behaviors, yet those behaviors often result from employee apathy. Every school must promote a culture in which employees share the responsibility of defending the school against cyber-attack (Kearney, 2010).

The human ability to rapidly learn is driving the growth of a globally connected network; however, the result is an overly complex system riddled with cybersecurity holes, leaving schools susceptible to information security threats (Evans, Maglaras, He, & Janicke, 2016). These attacks are becoming increasingly more sophisticated as advanced hacker tools develop. Advanced defense tools have developed as well but are still not enough to overcome the security risk posed by employee error. In information security management, people are the weakest link in organizations and any employee who violates information security policies makes their organization vulnerable (Boss, Kirsch, Angermeier, Shingler, & Boss, 2009).

In spite of the significant budgetary expenditures in tools and systems to fight cyberattacks, there is very little comparative investment in human factors and security culture. The behavior of humans in the security system is a direct reflection of the culture of information security in the school (Conteh & Schmick, 2016).

Awareness

Since people are the weakest link in the information security chain, particular attention should be paid to the human dimension (Safa, von Solms, & Futcher, 2016). One way to help this process is to build employee awareness in information security. Information security is perceived as the degree to which every employee understands the importance and consequences of internal guidelines for information security (Lebek, Uffen, Neumann, Hohler, & Britner, 2014). Increased employee awareness of information security should minimize the risk of employee behavior since awareness and training are the two most effective mitigating measures for human activities. Increasing human information security awareness is an important part of the holistic approach to managing information security (Sawyer, Finomore, Funke, Warm, Matthews, & Hancock, 2016).

The human factor often determines success or failure in managing information security. Each security breach incident in a school is more or less dependent not only on technology but primarily on human users (Hadlington, 2017). In order to mitigate the risk of information security, the school should be required to implement an awareness program for all employees. Information security awareness is a dynamic process, and awareness of information security by human users can contribute to the promotion of a positive security culture, thereby increasing the protection of information and data (Da Veiga, 2019).

Social Engineering

Social engineering is one of the simplest methods to gather information about a school through the process of exploiting human weakness that is inherit to every school. In essence, social engineering refers to the use of deceitful techniques to deliberately manipulate human targets (Hatfield, 2018). Social engineering is primarily used to induce victims to disclose confidential data, or to perform actions that breach security protocols, unknowingly infecting systems or releasing classified information (Flores & Ekstedt, 2016). An attacker engages social engineering as an approach to use human insiders and information to circumvent computer security programs through deceit. Social engineering attacks challenge information security workers because no technical countermeasures to-date can eliminate the human vulnerability. The basis of a social engineering attack is to avoid cyber security systems through deceit, exploiting the weakest link, the people involved. Throughout the interaction, victims are unaware of the destructive nature of their actions. The social engineer exploits innocent instincts, not criminal intent (Luo, Brody, Seazzu, & Burd, 2011).

Social engineering is challenging the security of all networks regardless of the robustness of their firewalls, cryptography methods, intrusion detection systems, and anti-virus software systems. Humans are more likely to trust other humans compared to computers or technologies (Aldawood & Skinner, 2019). Malicious activities accomplished through human interactions influence a person psychologically to divulge confidential information or to break the security procedures. Due to these human interactions, social engineering attacks are the most powerful attacks because they threaten all systems and networks (Lohani, 2019). They cannot be prevented using software or hardware solutions as long as people are not trained to prevent these attacks. Cyber criminals choose these attacks when there is no way to hack a system with no technical vulnerabilities (Salahdine, & Kaabouch, 2019).

THE HUMAN FACTOR: STUDENTS

Students around the globe connect, exchange ideas and learn and schools hold online sessions to make learning accessible to the world. While schools fear break-ins to their computer systems by professional criminals, students are increasingly giving educators almost as much to be concerned about. Reports of students' gaining access to school networks to change grades, delete teachers' files, or steal data are becoming more common. The "anywhere, anytime" accessibility of many networks can be tempting to students, who can penetrate them from both their school and home computers. Online chat rooms, listservs, and Web sites that give step-by-step directions on how to hack make it easy for students to access networks rich with confidential data (Bathon, 2013).

Growing student use of digital technology has led to increased concerns about access to, and the use of, student data created and gathered by educational websites, applications, and other online services (Lewandowski, 2019). Further, current federal student privacy laws are widely seen as inadequate and outdated. BYOD, or Bring Your Own Device, is a technique to give students the opportunity to bring their device of choice to school and connect to the school internet service.

Advocated as a means to increase student engagement, BYOD is not without security risks, primarily because students choose their own devices (Hovav & Putri, 2016). As a result, network architects and administrators often have to make tough choices about securing their networks

THE HUMAN FACTOR: EMPLOYEES

Information technology has brought with it many advantages for schools, but information security is still a major concern for schools which rely on such technology at the exclusion of analysis of the human factor (Maglaras, He, Janicke, & Evans, 2016). Employees, whether with intent or through negligence, are a great source of potential risk to schools, particularly through their decision making, Cyber risk is related to decision-making: where decisions often create largely unintended consequences for others. By virtue of its interconnectivity, unintended consequences can be multiplied many times, and in the cyber environment with extremely short timeframes (Liang, Biros, & Luse, 2016). Similarly, if the software tools provided by an organization are deemed inadequate by employees, they are often perfectly comfortable acquiring others, perhaps open-source freeware and even installing them on the organization's systems (Hadlington, 2018).

Attitudes and disregard for cybersecurity cause problems to arise with employees taking for granted measures designed to protect their networks (Evans, He, Maglaras, & Janicke, 2019). Just as an individual might be nonchalant about protecting personal computers or employing simple safeguards, a worker at a small school might think, "Why would we have to be so uptight about cybersecurity? Who would want to attack our school out in the middle of nowhere?" (McCormac, Zwaans, Parsons, Calic, Butavicius, & Pattinson, 2017). However, a phishing attack on a small network could be used as a "back door" to gain access to a larger system (Marchal, Armano, Grondahl, Saati, Singh, & Asokan, 2017).

Adversaries or cyber criminals can get into school systems relatively easily: we let them in. Phishing is a common technique to lure school employees into revealing sensitive information in an effort to compromise their bank, credit card or other personal accounts. In a phishing attempt, cyber criminals send an email purportedly to be from a legitimate person, organization or person. The recipient is asked to click on a link and enter sensitive information; the cyber-criminal then hijacks that account to steal what they can or try to lure the victim's contacts into the scheme. Another consequence of clicking on a phishing attempt could be that the link directs the person to a malicious page that infects the computer (Gupta, Arachchilage, & Psannis, 2018). A more advanced version of phishing is spear phishing which could be an email addressed to someone along the lines of "Dear Valued Customer" and sent out to the masses. A spear phishing attack, in contrast, is tailored to its target. A spear phishing attempt could appear to be from a legitimate sounding source such as a bank, government entity, or even the head of the targeted school, and be addressed to an employee or employees. The employee then gives away information as requested, often sensitive data about the school or its electronic information (Ani, He, & Tiwari, 2019).

Despite the heightened awareness to phishing, an employee could easily fall prey by hurriedly or even accidently clicking on a legitimate-looking link, thus opening up the network to a whole host of problems. Hackers can access the school network if an employee opens the cyber door for them (Esteves, Ramalho, & De Haro, 2017). Once malware is in place, viruses and worms can infect the school's operating systems. Consequently, school cybersecurity needs to move to a high level of consciousness (Guo, 2013). All the training would prove useless if one employee, out of the many thousands targeted, clicks on a link with malware. Cybersecurity has become more about behavioral aspects than of a purely technical concern. While most of the research has focused on explaining technical aspects of cybersecurity, the current environment dedicates close examination

of individual behavior as a key deterrent in the fight against cybercrime (Chu, Chau, & So, 2015).

Human factors in the context of information security have begun to gain increased attention, particularly where the use of security technologies have failed to protect schools from cyberattacks (Chou & Chou, 2016). The use of technologies is negated in instances where employees fail to follow cybersecurity protocols or engage in activities that place themselves and the school at risk. Researchers have found that employees consistently underestimated the probability of falling victim to a cybersecurity breach (Furnell, Khern-am-nuai, Esmael, Yang, & Li, 2018).

Most people tend to focus on technology when cyber security is mentioned but it is people that are the weakest point. While part of this can be attributed to education and training for users, it also emphasizes the need for policies to be in place for enforcement. For example, many users continue to use weak passwords, despite the increase risk from hacking, even though they are told to strengthen their passwords. Information security management should consider users and their perceptions as important factors in a secure environment (Ben-Asher & Gonzalez, 2015). Methods of mitigating and preventing cyber security risks need to be implemented and users, intentionally or through negligence, are an important threat to information security (Marble, Lawless, Mittu, Coyne, Abramson, & Sibley, 2015). In addition, some research is currently being conducted to determine if there are significant differences in the perceptions and behaviors of school staff members compared to the behavior of faculty.

PLANNING RECOMMENDATIONS

With the variety of threats present, what should school leaders and information technology managers do to attempt to mitigate cybersecurity issues at the school level? Nearly all schools are highly dependent on technology, specifically the internet, in their daily operations. As a consequence, internet incidents can affect the school's ability to meet educational goals. Security conscious schools are aware of cyber-risks and take measures to reduce this risk (Moody, Siponen, & Pahnila, 2018). However, it is not possible nor economically feasible to protect against all eventualities. The security planning process requires a thorough understanding of a system's assets, followed by identifying different vulnerabilities and threats that can exist and create dynamic disruption to the school (Lincke, 2015).

Plan for the Worst

Schools can benefit from a mixed approach to cyber-risk management by taking into account a wide variety of risk awareness techniques and measures to reduce risk. The best way to protect a school in cyberspace is by anticipating threats, looking at trends, learning from worst-case scenarios, and evolving with the environment (Kleinberg, Reinicke, & Cummings, 2015). Taking those bold steps and real action, instead of thinking "it will never happen to me," is part of the culture change necessary to focus on the dangers that are lurking in the vast expanse of cyberspace (Heidenreich & Gray, 2014). Cyber security promises protection and prevention using both innovative technology and an understanding of the human user. However, as a realistic activity, the school leader should plan for the worst, meaning understanding what the real consequences of a major cyber attack would entail and working backwards to develop a plan for mitigating the significances of such an attack (Hasib, 2018). In addition, school leaders must develop an attitude of, "It can happen at this school."

Plan for Ambiguity

Why is cybersecurity practice and instruction in its current state in schools? Perhaps it is because of ambiguity because cybersecurity is an emerging need to which schools have been

slow to adapt. Could it because teachers do not perceive they have the skills necessary to address cybersecurity issues in the classroom? Another possibility is that cybersecurity is often perceived as a business function. That is, cybersecurity is more of a concern of policymakers and information technology managers and school leaders than it is of teachers. Unfortunately, there does not appear to be a great deal of literature on the subject of educators' attitudes towards information security (D'Arcy & Lowry, 2017). This lack of understanding about the roles and functions of all personnel in the school leads to ambiguity and clouds the judgment of the educators in the school. What is needed is clear and present discussion and training to outline the roles and responsibilities of all persons, including students, for everyone in the school. Only when everyone is aware of their role can all participants be held accountable for their behavior and responsibility to protect the school and alleviate the ambiguity (Peccoud, Gallegos, Murch, Buchholz, & Raman, 2018).

Plan for Data Security

The primary purpose of cybersecurity in schools is to protect data and information. To successfully accomplish this, a comprehensive cybersecurity plan is essential. The following elements should be considered:

1. A school should identify the types of information in its possession, custody, or control for which it will establish security safeguards.

2. A school should assess anticipated threats, vulnerabilities, and risks to the security of protected information.

3. A school should establish and maintain appropriate policies and administrative, physical, and technical controls to address the identified threats, vulnerabilities, and risks to the security of protected information.

4. A school should inform all employees and participants (students) of their responsibilities in the security of the protected information.

5. A school should address the security of protected information in its third-party relationships.

6. A school should incorporate all school district expertise to create the most efficient and efficient deterrents to enhance the security of protected information.

7. A school should respond actively and aggressively to detected breaches of the security of protected information. (Bordoff, Chen, & Yan, 2017; Davis, 2018; Seemma, Nandhini, & Sowmiya, 2018; Tsohou, Karyda, Kokolakis, & Kiountouzis, 2015)

Plan to Develop Trust

Data breaches make up 50 percent of cyber threats (Jaeger, 2013). Students, faculty, and staff place trust in their school and its leaders, and when a data breach occurs the individuals compromised begin to lose trust in not only the school, but also they question the procedures that are set in place for prevention of data breaches and their protection. Many schools have had some form of data breach at their campus involving the personal identifiable information of students, and very few have had no data breaches, so developing and maintaining the trust of faculty, students and the school public is critical to the overall security system of the school (Lankton, McKnight, & Tripp, 2015).

Plan for Policy Compliance

As the focus of information security measures shifts from technology to human factors, many have investigated the influence and effect that information security policies have on the overall information security culture of the school (Siponen, Adam Mahmood, & Pahnila, 2014). Most schools are required to have an information security policy in place; if not they should develop

a policy. This is usually mandated by a regulatory authority (federal, state, local, accreditation, or auditor) as a condition of qualification and/or certification (Ifinedo, 2016).

Policies set mandatory guidelines to influence favorable organizational behavior when using systems or working with data. All information security policies should comply with and emphasize the school's mission and objectives (Al Kalbani, Deng, Kam, & Zhang, 2017). Security policies are created to communicate security protocols, assign clear roles and responsibilities, and provide employees with guidance to ensure security behaviors during the performance of their jobs. The roles, responsibilities, and guidelines also give clarity to who should be contacted and how information security incidents are handled (Bordoff, Chen, & Yan, 2017). When policies are complex, ambiguous, complicated, vague, or difficult for users to understand, attitudes towards compliance are negatively affected. Organizations should make their policies as understandable, relevant, and accessible as possible to all employees.

Plan and Conduct Training

Training and awareness is a foundational piece of all thriving information security cultures because people are the weakest link (Hai-Jew, 2019; Hall, 2016). Employees are provided with the requisite knowledge needed for proper use of systems, compliance with policies, and handling of data. Information security managers must implement training and awareness programs focused on policies, roles, and responsibilities (McIlwraith, 2016). Schools need to devote resources towards building information security skills across all levels of personnel and management employees. Regardless of the hardware or software system investment, the untrained or unaware employee becomes the focal point for cyberattacks (Simmonds, 2018).

Long-term training is necessary to reasonably reduce human susceptibility to violating cybersecurity protocols and exposing the school to cyberattack (Joinson & Steen, 2018). However, existing training procedures may not be effective because the cybercriminals continue to develop new and more sophisticated procedures and processes. For example, adversaries launch several new phishing websites when existing ones are blacklisted. Unfortunately, many organizations fail to maintain a high level of information security awareness over a long term (Caldwell, 2016). A continuous program that focuses on information security is required to ensure that employees will be reminded of the rules.

CLOSING THOUGHTS

The best way to protect a school in cyberspace is examining trends, learning from worst-case scenarios, and evolving with the environment. Taking those bold steps and real action, instead of thinking "it will never happen to me" is part of the culture change. If a school's leadership demonstrates and instills the importance of cybersecurity and good cyber behavior, the mindset could rub off on the employees and improve the culture. School leaders cannot expect school personnel and students to behave responsibly without providing them with the knowledge and resources to be effective. Employees are the first line of defense for the school cybersecurity system (Zammani & Razali, 2016).

Conclusions

(1) Current researchers investigating mitigating risks for school cybersecurity suggest that a 'one-size-fits-all' approach to securing cybersecurity is not currently working.
(2) More work should focus on why mitigating threats from human actors within the system is critical to the long-term success of school cybersecurity.
(3) The pace of change and advancements in technology cybersecurity has been astonishing but not shared on the human side.

(4) Continuous changes have left an ever-increasing gap between cybersecurity technological improvements and the human factor.

(5) Technological aspects of cybersecurity will continue to grow and become more effective, but what of the human factor?

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PARENTS' PERCEPTIONS OF INFLUENCE OF VIOLENT CARTOONS ON PRIMARY SCHOOL PUPILS' SOCIAL BEHAVIORS

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ABSTRACT

Children have very sensitive minds that are shaped mostly by the environment where they grow up. These include their day by day experiences of which their parents play a significant role. It has been found globally that cartoons affect children's behavior. However, in Nigerian context, the nature of cartoon influence on children is not known, and also it has not been determined if parents are aware of this influence. This study examined the influence of cartoons on Nigerian children's social behavior from the perspective of parents. A survey research design was adopted for the study and data were collected from 100 parents through questionnaire. Frequency counts and percentages were used for data analysis. The findings showed that most children watched cartoons on daily and weekly basis; most of the children watched violent cartoons where there were lots of fights, hero was violent, characters shouted and abused one another. Parents perceptions on influence of violent cartoon on children behavior was found to be neutral. It is recommended that training programs should be organized for parents and guardians by the government and organizations on the influence of media on children social behavior and development. Parents should examine the contents of cartoons they provide for their children to ensure that they do not have elements of violence that can affect the children negatively. Parents should intentionally censor the cartoons that their children are exposed to, in terms of age appropriateness and portrayal of violent behavior to be able to prevent the negative influences such cartoons might have on children. Parents and guardians should educate their children on acceptable family and societal values. Entertainment industries should provide policies that will educate parents on what to look out for in violent cartoons.

INTRODUCTION

Parenting children is an honor that comes with a challenge. In the development of children, parents play a very crucial role. They guide the children into the world, lead and show them how to grow up and to be good adults. Parents teach children family and societal values as well. Values are the 'rules' we live by, for example, treating objects and people with respect and care of one another (Department of Social Development and UNICEF, 2008). Parents' responsibility also includes the provision of all that is needed for children's optimal development. French (2007), recognized play as one of the major contexts whereby children's early learning and development take place. Therefore, it is the duty of parents to provide play materials or context that will support children's learning and development. Many television programs for children are presented in cartoon forms which is a form of play, an avenue by which children learn.

REVIEW OF LITERATURE

Cartoons and Children Learning at Home

Cartoons became part of the cinema history in the late 1800s, the time the first motion pictures were made. A cartoon is a motion picture, mainly a humorous film intended for children, made by using animation instead of live actors (Thompson, 2010). We can also describe cartoons as movies that are made by filming a sequence of slightly varying drawings or models so that they appear to move and change when the sequence is shown. These are the things that keep viewers (mostly children) fastened to their seats. Initially cartoons were very short because people would be watching these shots in the movie theatres before their feature film. As time went on cartoonists were able to put their shows on TV with extended time, creating the half hour block films that are on Nickelodeon, Cartoon Network, and the Disney Channels today. Also, for more people to watch the show, the cartoons were made to be more "family friendly" (Kapelian, 2009)

It has been discovered worldwide that children are using many hours to watch cartoons. According to a survey in the United States, children watched up to six hours of television in a day. A high percentage of the television time was not regulated and was meant for adult viewers (Muss,1999). In Nigeria, cartoon has become a primary source of learning and entertainment and children are engrossed in it. However, the way children understand what they watch on television may affect how they are influenced by cartoon violence. There is a form of learning process that takes place while children are watching cartoons. They tend to act whatever they learn, thereby influencing their mode of relating with other children and the world in general. Children focus more on actions they see than internal causes, and this applies to parents too. Significantly, the media has become a prime means by which many people experience or learn about different aspects of the world (Baran & Davis, 2003; Baran & Davis,2009). Similarly, people who do not learn from the media directly, learn from other people who got their idea from the media. Buonanno (2008) reported that television escorted children across the globe before they had the permission to cross the street.

Cartoons and Children Social Behaviors

The sum of all the interactions that a child is involved in is known as social behavior, this ranges from his/her conduct to diction, dress sense and even inclinations. Social behavior also refers to the way in which a person responds to a set of conditions. Hartup (as cited in Oyero & Oyesomi, 2014) gave a more technical definition of social behavior as activity provoked by stimuli arising from people or activity which in itself possesses stimulus value for people. Good or normal social behavior is not something that children naturally possess. They build it up by watching others. Exposure to media violence is positively related to subsequent aggressive behaviors, aggressive ideas, arousal and anger (Bushman & Cantor, as cited in Aisha, Bala, & Ismaila, 2016).

Children's cognitive behavior according to studies is being influenced by what they view on television; the kind of content they are exposed to. When children watch educational programs, they are more likely to have higher grades, read more books, place greater value on achievement, and show more creativity. While children who watch more violent or purely 'entertainment' television perform less (Diehl & Toelle, 2011). A major cause of aggressive behavior in children has been attributed to watching violent television programs. From the time children learn to talk, they are fascinated by the sounds and moving images (Baran & Davis, 2003;2009). Violence and bad language from the media have a negative influence on a child's developing mind because a child's mind is like a mop that absorbs everything that he/she sees and hears. Being constantly exposed to cartoons with violence and fighting, children's behavior could result in teenage violence in the future (Garden, 2008).

Parental Awareness of Cartoons' Effect on Children

Another factor that also determines how television affects a child is the age of the child. The elementary school age (ages 6 to 12) is deemed a critical period for understanding the effects of television on children. At this stage, children develop the attention span and cognitive ability to follow continuous plots and recognize motivation and consequences to character actions. Children's learning ability grows faster than adults, during this age (Wartella & Robb, 2007). Kaiser Family Foundation conducted a study in 2003 and the findings showed that almost half (47 per cent) of the parents with children between the ages 4 and 6 reported that their children had copied aggressive behaviors from TV (Ride, Vandewater & Wartella, 2003). The situation is similar to what has been found among children in Nigeria. There is an increase in violent behavior among children and the society in general (Ukaoha, 2013). One wonders at what is happening to children in their homes that are supposed to be the cradles of their character formation. Are they exposed to things that teach them violence? The child completely depends on the parents for care and support. The child is only able to make progress through the assistance of the parents (Osanyin, 2004). It is the duty of the parent to protect the child from anything that will hinder his/her development.

In Nigeria today, watching diverse kinds of cartoons by children have received great approval in many homes and parents keep on buying new cartoons for their children as they are released into the market. This is because most parents are working round the clock to be able to meet the family's needs and have little or no time to spend with their children. A good number of them therefore resort to providing their children with cartoon network and other TV cartoon programs as sources of entertainment and learning to keep the children busy without minding the contents of such cartoons. The question is, do parents know the contents of the cartoons their children watch and the influence of the violent cartoons on their children's social behavior?

STATEMENT OF THE PROBLEM

Violence is widespread across different regions of the world and Nigeria is a good example. It is also increasingly cutting across different ages and genders. Children are affected by the media contents they take in. They learn faster than adults, and their portrayal of media messages is incomparable There is generally an increasing trend of violent behavior among primary school pupils in Nigeria today which needs urgent attention else the children will grow up to be violent adults hindering peace and development of the society. Since most children TV programs are presented in entertainment form especially in the form of cartoons, and many parents are comfortable with it. It is important to examine the perceptions of parents on the influence these cartoons especially, those by which the characters exhibit violent behavior on children.

PURPOSE OF THE STUDY

This study is aimed at finding out the perceptions of parents on the influence of violent cartoons on children's social behavior. Specifically, the study sought to

1. investigate the frequency by which children watch cartoon programs,
2. explore the extent to which children watch violent cartoons, and
3. examine the perception of parents on the influence of violent cartoon on children's social behavior.

RESEARCH QUESTIONS

The following research questions are developed in support of the study:

1. How often do children watch cartoon programs?

2. To what extent do children watch violent cartoons?
3. What are the perceptions of parents on the influence of violent cartoons on children's social behavior?

METHODOLOGY

The descriptive survey research design was adopted in this study. The population of the study includes parents of 150 middle basic pupils in the University of Lagos (UNILAG) Staff School. A sample size of 100 respondents selected through convenience sampling technique participated in the study. The respondents were selected during the school's Inter-House Sport Activities. UNILAG Staff School was used for the study because it has a good representation of children from different parts of Nigeria, and a major percentage of the pupils come from middle class backgrounds, where they can afford cable television which gives them unlimited access to a number of television cartoon stations.

A self-constructed questionnaire with reliability value of 0.88 was used for the study. The questionnaire was divided into two sections, A and B. Section A comprised respondent's background information while section B was used to collect information based on the research questions raised. One hundred copies of the questionnaires were administered to the respondents by the researcher with the help of three assistants. All the questionnaires were properly filled and returned on schedule with 100% response rate. The quantitative data collected from the questionnaires were analyzed by using descriptive statistics of frequency counts and percentages.

FINDINGS

The demographic distribution of the respondents is displayed in Table 1. Of the 100 parents that participated in the study, 18 (18%) of them were males and 82 (82%) females. Considering their age, 31 (31%) were between ages 21 and 30years; 44 (44%) of them fell between age 31 and 40years; the other25 (25%) were between 41 and 50years. In terms of marital status, 13 (13%) were single parents and 87 (87%) married. Respondents' data distribution by levels of education shows that 2 (2%) had primary education; 10 (10%) had secondary education while 88 (88%) of them received tertiary education.

Table 1:
Background Information of the Respondents

	Frequency	Percentage (%)
Gender		
Male	18	18.0
Female	82	82.0
Age		
21- 30yrs	31	31.0
31-40yrs	44	44.0
41-50yrs	25	25.0
Marital Status		
Single Parent	13	13.0
Married	87	87.0

	Frequency	Percentage (%)
Level of Education		
Primary	2	2.0
Secondary	10	10.0
Tertiary	88	88.0

Research Question 1: How often do children watch cartoon programs?

Table 2 shows the frequencies by which children watch cartoon programs as follows: 42 (42%) daily; 45 (45%) weekly; 1(1%) monthly; and 12 (12%) of the respondents indicated others.

Table 2:
How often Children Watch Cartoon Programs?

	Frequency	Percentage (%)
Daily	42	42.0
Weekly	45	45.0
Monthly	1	1.0
Others	12	12.0

Research Question 2: To what extent do children watch violent cartoons?

According to the findings as shown in Table 3, respondents indicated the extent to which children watch violent cartoons as follows: cartoons that have lots of fights in it -12 (12%) to a very large extent, 22 (22%) to a large extent, 38 (38%) to some extent and 28 (28%) of the respondents indicated that their children did not watch cartoon programs with lots of fight in it. On children watching cartoons that the hero is violent, parents' responses were as follows: 34 (34%) to a very large extent; 37 (37%) to a large extent, 10 (10%) to some extent and 19 (19%) of the respondents indicated that their children did not watch cartoons that the hero is violent. For watching cartoons where the characters shout at each other, 44 (44%) of the respondents indicated to a very large extent, 32 (32%) to a large extent, 11 (11%) to some extent and 13 (13%) not at all. In the area of children watching cartoons where the characters abuse one another, 33 (33%) of the respondents indicated to a very large extent; 42 (42%) to a large; 18 (18%) to some extent and 7 (7%) of the respondents indicated that their children did not watch at all cartoons where the characters abuse at each other.

Table 3:
The Extent to which children watch violent cartoons

	Very Large Extent	Large Extent	Some Extent	Not at all
My children watch cartoons that have lots of fighting	12 (12.0%)	22 (22.0%)	38 (38.0%)	28 (28.0%)
My children watch cartoons that the hero is violent	34 (34.0%)	37 (37.0%)	10 (10.0%)	19 (19.0%)
My children watch cartoons where the characters shout at each other	44 (44.0%)	32 (32.0%)	11 (11%)	13 (13%)
My children watch cartoons where the characters abuse each other	33 (33.0%)	42 (42.0%)	18 (18.0%)	7 (7.0%)

Research Question 3: What are the perceptions of parents on the influence of the violent cartoon on children's social behavior?

Table 4 shows the respondents' perceptions on the influence of violent cartoons on children' social behavior as follows:

* Children behave violently because of what they watch in the cartoon: 14 (14%) strongly agree; 34 (34%) agree; 2 (2%) neutral; 28 (28%) disagree and 22 (22%) strongly disagree (X= 2.90, SD= 1.43).

* Being aggressive is a habit my children learn from cartoon: 17 (17%) of the respondents indicated strongly agree; 25 (25%) agree; 2 (2%) neutral, 32 (32%) disagree and 24 (24%) strongly disagree (X=2.79 , SD = 1.48).

* My children practice the fight they learn from watching cartoon with their peers: 11 (11%) strongly agree; 42 (42%) agree; 8 (8%) neutral; 25 (25%) disagree and 14 (14%) of the respondents strongly disagree that their children practice the fight they learn from watching cartoon with their peers (X = 3.11 , SD = 1.29) .

* My children threaten other children and I feel they watch it from cartoon: 6 (6%) of the respondents strongly agree that their children threaten other children and they feel they watch it from cartoon; 32 (32%) indicated agree; 5 (5%) neutral; 34 (34%) disagree and 23 (23%) strongly disagree (X = 2.64 , SD = 1. 31) .

* My children behave like the characters in the cartoons they watch: the respondents 11 (11%) strongly agree; 64 (64%) agree**;** 7 (7%) neutral; 9 (9%) disagree and 9 (9%) strongly disagree (X = 3.59, SD = 1.09).

* Watching too much cartoon of a particular role model can make a child behave aggressively: 26 (26%) strongly agree; 35 (35%) agree; 10 (10%) neutral; 17 (17%) disagree and 12 (12%) of the respondents strongly disagree that watching too much cartoon of a particular role model can make a child behave aggressively (X= 3.46, SD= 1.35).

* My children drive their toy cars and ride their bicycles in risky manner after watching cartoon: 10 (10%) of the respondents indicated strongly agree, 28 (28%) agree; 7 (7%) neutral; 35 (35%) disagree and 20 (20%) of the respondents strongly disagree that their children drive their toy cars and ride their bicycle in risky manner after watching cartoon (X = 2.79, SD=1.33) .

The weighted average mean of all the means of the seven items is 3.04. which on the neutral area of the five-point weighing scale.

Table 4:
Influence of Violent Cartoons on Children Behavior

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	SD
My children behave violently because of what they watch in the cartoon	14 (14.0%)	34 (34.0%)	2 (2.0%)	28.0 (28.0%)	22 (22.0%)	2.90	1.43
Being aggressive is a habit my children learn from cartoon	17 (17.0%)	25 (25.0%)	2 (2.0%)	32 (32.0%)	24 (24.0%)	2.79	1.48
My children practice the fight they learn from watching cartoon with their peers	11 (11.0%)	42 (42.0%)	8 (8.0%)	25 (25.0%)	14 (14.0%)	3.11	1.29
My children threaten other children and I feel they watch it from cartoon	6 (6.0%)	32 (32.0%)	5 (5.0%)	34.0 (34.0%)	23 (23.0%)	2.64	1.31
My children behave like the characters in the cartoons they watch	11 (11.0%)	64 (64.0%)	7 (7.0%)	9 (9.0%)	9 (9.0%)	3.59	1.09
Watching too much cartoon of a particular role model can make a child behave aggressively	26 (26.0%)	35 (35.0%)	10 (10.0%)	17 (17.0%)	12 (12.0%)	3.46	1.35
My children drive their toy cars and ride their bicycle in risky manner after watching cartoon	10 (10.0%)	28 (28.0%)	7 (7.0%)	35 (35.0%)	20 (20.0%)	2.79	1.33
Weighted Average						3.04	1.33

Decisions:1.00 – 1.99 (Strongly disagreed), 2.00-2.99 (Disagreed), 3.00 – 3.99 (Neutral), 4.00 – 4.99 (Agreed), 5.00 – 5.99 (Strongly Agreed)

DISCUSSION

Analysis of data revealed that majority (82%) of the respondents were females (mothers), married and between the ages of 31 and 40years. Most of them are educated and their educational attainment was up to the tertiary level.

On how often children watch cartoon programs, the findings revealed that a good number of children watch cartoon programs on daily and weekly basis. This agrees with the assertion that children like watching cartoons (Kapelian, 2009). According to Baran and Davis (2003; 2009), the media is one of the major ways by which people experience or learn about different aspects of the world. Even when these ideas are not directly learnt from the media, we learn from others who got their idea from media. It is therefore necessary to use the media as an avenue to teach children acceptable behaviors that will aid their development since they like watching cartoons, instead of using it to teach them what will destroy their lives and that of the society in general.

Considering the extent to which children watch violent cartoons, the result showed that most of the children watched violent cartoons where there are lots of fights, hero is violent, characters shout and abuse one another. Diehl and Toelle (2011) opined that it is the kind of television

content the children are exposed to that has influence on them. Children exposed to educational television programs are prone to having higher grades, reading more books, placing greater value on achievement, and showing more creativity than those who watch more violent or only 'entertainment' television.

Analysis of data on the perception of parents on the influence of violent cartoon on children's behavior revealed that from parents' perspective, watching violent cartoons makes children to be aggressive, fight with peers, and threaten other children. Although 55% of the parents perceived that violent cartoons do not make their children drive their toy cars and ride their bicycles in risky manner. Close to fifty percent (48%) of the parents perceived that their children behave violently as a result of what they watch in the cartoon. 42% of them perceived that aggressive habit is what their children learn from cartoon. This buttresses the finding of an earlier research that children imitate aggressive behaviors from TV (Ride, Vandewater & Wartella, 2003,). According to Piaget (1952), children learn through imitation particularly, from age 0 – 12 years. However, the weighted average was 3.04 which shows that parents' perception on the influence of the violent cartoon on children's behavior was neutral. This should not be the case, good parenting entails knowing what is right for children development and well-being and guiding them (children) to do such.

IMPLICATIONS FOR EDUCATIONAL PLANNING

Findings from this study have the following implications for educational planning regarding the education of the children:

i. School administrators need to ensure adequate training of teachers in proper handling and monitoring of children while watching the cartoons.
ii. School administrators should plan for effective guidance and counseling services in schools to address problems associated with the negative effects of cartoons watching.
iii. School administrators should ensure that there is a common room that acts as a playing ground for children in addition to a TV watching room.

CONCLUSION

Children enjoy watching cartoon and parents can use it as an avenue to aid children's learning and development. Parents' understanding of the contents and influence of cartoon will determine the kind of cartoon they provide and allow their children to watch. The results of the study have established that children like watching cartoons and most of them watch it on daily and weekly basis. The findings also indicated that most children like to watch violent cartoons. Additionally, this study has shown that parents' perceptions on the influence of violent cartoon on children behavior is neutral. The significance of this finding has shed light on an alarm to parents to closely supervise the contents of the cartoon programs their children watch.

RECOMMENDATIONS

In order to reduce the influence of cartoon violence on children behavior, the study makes the following recommendations:

1. Training programs need to be organized for parents and guardians by the government and professional organizations on the influence of media on children social behavior and development.
2. Parents should scrutinize the contents of cartoon they provide for their children to ensure that they do not have elements of violence that can affect the children negatively.

3. Parents should make conscious efforts to monitor the cartoons that their children are exposed to, in terms age appropriateness and portrayal of violent behavior in order to combat the negative influences such cartoons might have on their viewers.
4. Parents and guardians should educate their children on acceptable family and societal values. Teach them the right things to do and what they should not do. This instruction should also be given to anyone that takes care of the children when the parents are not around.
5. Government, private organizations as well as non-governmental organizations should also play a vital role in monitoring and controlling children programs and cartoons in the media and the market. They should sponsor young and upcoming animators to encourage them to develop indigenous cartoons that will help promote healthy citizenship in society.
6. Entertainment industries should provide policies that will educate parents on what to look out for violent cartoons.

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MAKING SENSE OF MULTIPLE OPTIONS FOR THE DESIGN OF A CLASSROOM

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ABSTRACT

The changing nature of education has forced educators to rethink the role of classrooms in student learning. Prior research has shown that the environmental and structural design of education centers impact student learning. With a dozen variables to deal with, classroom designers are faced with the daunting task of selecting one plan from the thousands that are possible. This paper demonstrates how tradespace exploration (TSE), an analytical methodology used by NASA and the DoD to design spacecraft and other complex systems, can be applied to the design of classrooms. To demonstrate the TSE methodology, a predictive model was built based on historical data collected by prior researchers on third and fifth grader test performance and data along 86 descriptive variables that they used to characterize the school and classrooms. An analysis of main effects using a multi-way ANOVA allowed the larger data set to be reduced to 8 composite independent variables that are predictive of student tests scores. This model was then used to generate thousands of possible school and classroom design permutations and predict the resulting student test scores. This allowed the authors to identify the Pareto frontier of designs that yield the greatest benefits for a given investment. The case study described in this paper demonstrates how this approach could be applied to enable decision-makers to identify a more effective allocation of resources or determine when changes in total investment are likely to have a significant impact on desired performance.

INTRODUCTION

Can the designers of classrooms borrow a process used by satellite project managers to select a design that yields the greatest outcome for the investment? In both cases, designers have a variety of features that come in different sizes to choose from: multiple options yield thousands of variations of the final product. NASA and the Department of Defense (DoD) are currently using a process called tradespace exploration (TSE) to model the effects of multiple design parameters and aid in the selection of a plan that best addresses an immediate need. This paper represents an initial attempt to demonstrate how TSE can be utilized to inform classroom design decisions that result in the greatest student achievement for the money invested.

BACKGROUND

The changing nature of education has forced educators to rethink the role of classrooms in student learning. School facility planners need to pay a greater amount of attention to the design of classrooms. Improvements at that level "will directly benefit the young children in schools" (Achilles, 1999, p. 2). Students relate to the built surroundings where they spend a school day. The environmental and structural design of this learning center impacts student learning (Earthman & LeMasters, 2009; Tanner, 2009, 2014).

"Structure must change before culture can change" (Ouchi, 2004, p. 18). There are several structural and environmental factors (controlled variables) that contribute to student success. Among these are: floor space, ceiling height (relates to room volume), area of window glass (relates

to natural light), light fixtures, temperature control, air quality, cleanliness, air conditioning, safety, noise level, view of the environment, color of classroom walls, and cost (American Federation of Teachers, 2006; Duncanson, 2014; Earthman, 2004; National Summit on School Design, 2005; Tanner, 2014). With a dozen variables to deal with, classroom designers are faced with the task of selecting one plan from the thousands that are possible.

THEORY OF MAKING CHOICES

People make choices every day without a lot of thought: what to wear, what to eat. Decisions that affect a lot of people or large amounts of money involve a large risk (Buchanan & O'Connell, 2006). Risk is a numbers game that people deal with in different ways. The aim of good decision-making is to choose an available alternative that offers the greatest benefit relative to the cost or other resources that must be given up to achieve it.

Having an excessive number of choices can be a bad thing. That situation leads people to feel they could have done better if they had more time (Tugend, 2010). That is the situation educators face when designing a classroom. Just using the eight variables from the case study shown in this paper, with five different levels for each results in more than 100,000 possible designs. Creating a mathematical model can move people toward making a rational decision. Using TSE has the power to assist classroom planners in the selection of a design that supports educational goals.

TRADESPACE EXPLORATION

Tradespace exploration (TSE) is a process to deal with complex planning problems that include large sets of data. TSE can provide a way to model the effects of multiple design parameters, their impact on test performance and cost to better inform strategic decision-making. Running an integrated model for multiple permutations of different levels of the design variables results in a large set of candidate alternatives (e.g. tradespace). As shown in Figure 1, this allows us to plot each alternative relative to its cost to graphically identify the best alternatives. The alternatives that cannot be improved in terms of the benefit they provide without becoming worse off on the cost axes (or vice versa) are called Pareto optimal solutions (Pareto, 1906). The set of all such solutions define the Pareto frontier. If the design requirements are adequately characterized, the designer wishes only to consider Pareto Optimal solutions because these solutions provide the most benefit relative to their cost.

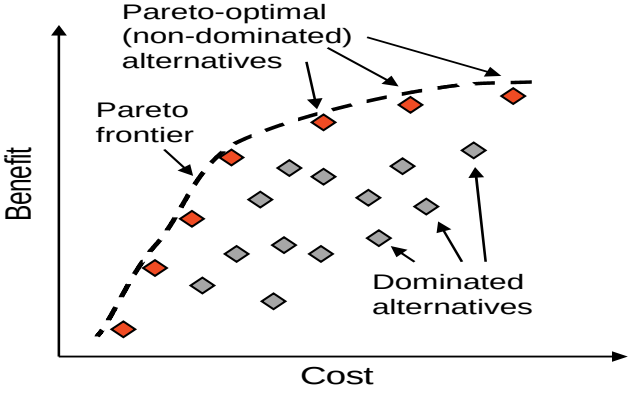

Figure 1. A plot of the permutations of the design variables produces a curved surface called the Pareto frontier. Points along thr curve are the best choices for the product being designed relative to the cost (Curry, 2014).

KEY INDEPENDENT FACTORS

Tanner (2009) reported the results of studies that correlated classroom characteristics to student achievement. These areas will be used in the TSE.

Table 1
Correlations between key factors and student test scores (Tanner, 2009)

Characteristic	Pearson Correlation (R)
Light – window area	0.592
Wall color	0.545
Pathways - % open floor space	0.503
View of environment	0.502
Available technology	0.506
Quiet places	0.478
Display space	0.475
Safety	0.439

Natural Light – Window Area - View of the Environment

A feeling of comfort can be added by the view from the windows. Students need to see outside. Anthes (2009) states:

> …students with restricted views of at least 50 feet outside the window, including gardens, mountains and other natural elements, had higher scores on tests of vocabulary, language arts and math than did students without such expansive vistas of whose classrooms primarily overlooked
> roads, parking lots and other urban features (p. 56).

Tanner (2009) reported that 25-50 sq.ft. of windows was needed for each 100 sq.ft. of classroom floor. Natural light has a positive effect on student outcomes in Science and Reading Vocabulary scores. Natural light adds to physical and mental comfort. Tanner (2015) noted that "Outside green spaces and "views" and "views overlooking life" are a logical consequence of having windows in classrooms" (p. 7).

Wall Color

Cash & Twiford (2010) found that a focal point in a classroom was best identified through the use of one medium tone of blue, brown or gray with a neutral surrounding. Younger children like bright colors. It contributes to less eye strain and increased attention span. A feature wall with a bright color enhances learning. Splashes of color on the floor, desks and chairs can complement the walls (Barrett, Zhang, Davies, & Barrett, 2015). Dark colors, black, and gray lead to negative feelings for the occupants. Black and gray are the least preferred colors by students. White walls result in under-stimulation leading to restlessness and loss of concentration. Youngsters describe these colors as being weird (Jalil, Yunus, & Said, 2012).

Pathways - % Open Floor Space

Young children are "rug-rats": they look at space horizontally. Given a choice, youngsters will spread out on the floor. They require greater amounts of horizontal space than adults (Achilles,

1999). Open floor space is positively correlated to higher test scores in Science and English Language Arts (Duncanson, 2003, 2009). Open space on the floor is important to provide broad pathways so students can move freely (Tanner, 2009). Narrow pathways between rows of student desks do not count as open floor space. Two youngsters need to be able to pass each other without making contact.

Available Technology

Computers have become a powerful educational tool. It is important to regulate their use so they do not override personal interaction between students (Higgins & others, 2005). Technology has enabled students to collaborate on a global scale. The scope of global problems is now an open area for students where they can involve themselves using problem solving skills to address topics of interest to them. The opportunity to follow their own passion often leads to students staying on an important task and be self-directed: practices valued by adults (Schwartz, 2013). Teachers can empower students when appropriate technology and communication tools are readily available for the students to use (November, 2018).

Quiet Places

Good acoustics – meaning a quiet environment – is essential to support adequate academic performance. Noise distracts attention to the learning process and results in impaired performance particularly in reading proficiency. Children lose track of what they are thinking and thus fail to transfer knowledge into memory. Noise affects mood. This is especially true during times of silent reading when external noise becomes distracting. The use of carpeting can help to alleviate this problem (Higgins & others, 2005).

Teachers are beginning to alter classrooms to increase the number of quiet, comfortable areas for students. The Clearview School in Rolleston, New Zealand, created classrooms so students could sit on the floor on bean bags, ottomans, or at tall desks with whiteboard surfaces they can write on. Staff and students love it. The principal cites higher levels of student engagement. Students are taking more responsibility for their learning. Teachers say they will never go back to an old-fashioned classroom (Law, 2013).

Display Space

Displaying student work is important. Uncluttered displays increase youngster's feelings of ownership and make schools more welcoming (Higgins & others, 2005). Well planned bulletin boards can teach material pertinent to the current curriculum. When students plan and create displays they practice problem solving and learn about important academic topics. Artwork, writing, photos, and 3-D projects should each have their own section to look organized. Bulletin boards need to be visible to all students and the teacher should refer to it each day (Duncanson, 2006).

Safety

Communities expect that students will be safe while in school. School districts are now required to develop a District-wide School Safety Plan designed to prevent or minimize the effects of serious violent incidents and emergencies and to facilitate the coordination of the district with local and county resources in the event of such incidents or emergencies. District personnel must have a plan to deal with violence, natural hazards, and technological incidents. Natural hazards can include dangerous weather conditions (ice, snow, fog, tornado, trees blown across highways), and chemical/biological hazards. Actions of administrators and teachers must be outlined for each category of concern (Pine Bush, 2017).

MODEL DEVELOPMENT

To apply tradespace exploration to analyze school designs we must first build a model that relates the 8 key areas described above and any additional independent variables to student classroom performance. To do so, we can draw upon the source data used to calculate the correlations in Table 1 as originally described by Yarborough (2001). Yarborough collected data student test score data for 24 schools and descriptive data along 86 different dimensions that characterize the school and classrooms. For each of these schools other independent factors such as demographic data and training and experience level of the teachers was also collected.

Using this data an analysis of main effects was performed using a multi-dimensional analysis of variance (ANOVA) to identify the dominant independent variables that contribute to third and fifth grade test scores. Of the 86 variables collected, the ANOVA identified 20 of the 86 variables as the primary contributors to student test scores. These 20 variables could be categorized into the 8 key areas identified above to create 8 composite variables for each of the 24 schools as shown in Table 2. From there, a multi-dimensional regression model was built using the Eureka software package that uses machine-learning to identify equations that relate the 8 composite variables to third and fifth grade test scores for the 24 schools.

To confirm the predictive power of the developed model it was run using the 8 composite variables for each of the 24 schools. As shown in Figure 2 below, when the model outputs are plotted against the actual test scores reported by Yarborough there are a few outliers, but the model generally tracks close to the actual data. For the developed model the average residual (difference between actual test score and score predicted by the model) was around 4 test points.

To apply tradespace exploration to this problem we also need a model of the cost expended for each school design. Since actual cost data was not available for the 24 schools a notional "cost score" was created by summing the 8 composite variables for each school as a proxy measure for cost. This model could be replaced with a more realistic cost model when more detailed data becomes available. As shown in Figure 3, when this notional cost score is plotted against the average predicted test score for third and fifth graders for each school we see that cost generally increases with test scores as might be expected.

Table 2
Actual test scores and composite descriptive variables for 24 schools (0 – 10 scale)

School	3rd Grade Scores	5th Grade scores	Light	View	Color	Paths	Tech	Quiet	Display	Safety
1	29	24	5.5	4.3	6.3	7.0	0.0	2.3	0.0	8.0
2	35	32	8.0	6.3	7.3	7.0	5.0	2.3	10.0	10.0
3	27	33	2.0	1.7	3.5	7.0	0.0	2.3	0.0	10.0
4	60	37	3.0	2.7	6.3	8.0	8.0	0.7	0.0	10.0
5	33	38	6.5	7.0	9.5	9.0	6.0	3.3	2.0	2.0
6	33	41	3.5	4.3	6.7	6.0	7.0	3.3	0.0	10.0
7	34	43	6.0	3.7	7.3	8.0	7.0	4.0	0.0	8.0
8	51	48	5.0	5.0	6.3	5.0	7.0	0.7	5.0	8.0
9	52	49	5.0	7.3	7.2	7.0	4.0	5.3	0.0	10.0
10	43	51	4.5	4.0	6.3	8.0	4.0	1.7	0.0	10.0
11	35	51	5.0	5.0	7.5	8.0	3.0	2.0	2.0	8.0
12	70	53	9.5	7.3	6.8	10.0	10.0	3.3	0.0	10.0
13	48	54	6.5	7.3	9.2	10.0	8.0	5.0	6.0	10.0
14	60	56	3.5	4.3	5.8	6.0	10.0	2.0	0.0	10.0
15	56	57	7.5	4.7	6.5	8.0	5.0	0.3	0.0	10.0
16	63	57	6.0	8.7	9.2	8.0	5.0	4.7	0.0	10.0
17	44	58	7.5	5.0	5.7	10.0	10.0	4.0	10.0	10.0
18	47	59	6.5	6.3	7.2	7.0	4.0	0.7	8.0	10.0
19	54	60	7.0	3.3	5.5	8.0	5.0	2.7	0.0	7.0
20	63	62	7.5	7.0	4.8	10.0	8.0	0.0	0.0	10.0
21	57	64	5.5	6.0	3.8	10.0	5.0	2.7	8.0	10.0
22	62	64	7.0	6.0	8.0	8.0	8.0	1.3	0.0	10.0
23	59	68	6.0	3.0	9.2	7.0	8.0	1.7	0.0	10.0
24	72	72	5.0	5.7	5.8	9.0	4.0	3.3	0.0	10.0

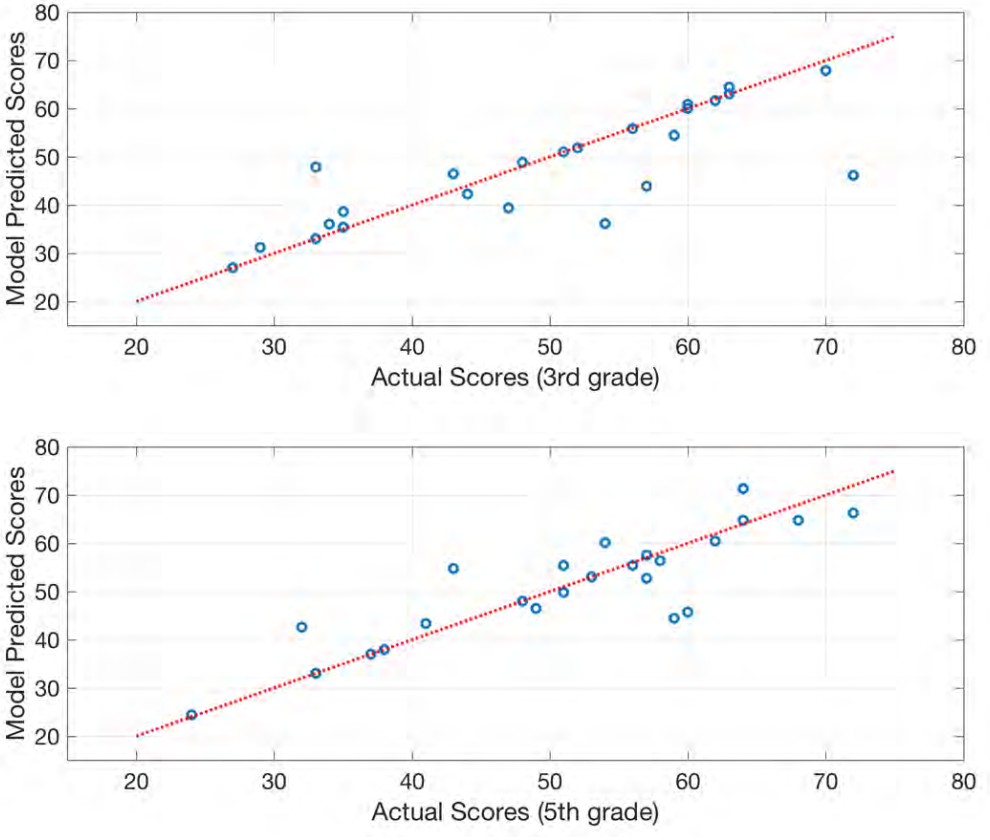

Figure 2. Comparison of model predicted test scores with actual test scores for third and fifth grade students.

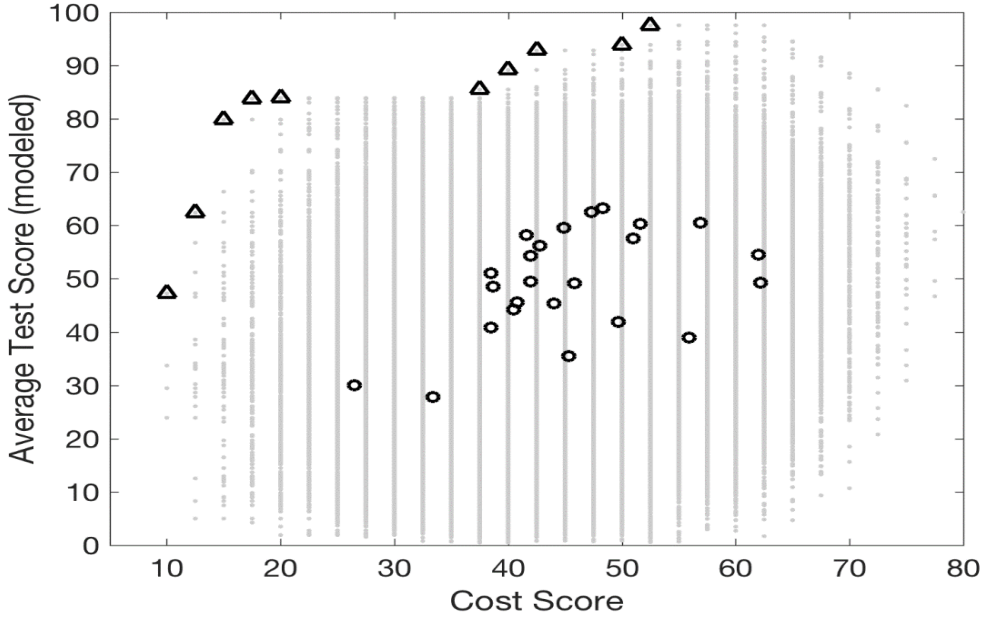

Figure 3. Average test scores versus a notional cost score for the 24 schools.

RESULTS

Applying the model described in the previous section a large number of theoretical school design concepts can be generated. If we consider 5 different levels (ranging from a minimum score of 0 to a maximum of 10) for each of the 8 model input variables we can enumerate 5^8 combinations and run the model to predict third and fifth grade test scores and associated cost score for each design concept. Eliminating the infeasible designs leaves us with approximately 150,000 combinations of schools that could be built.

Figure 4 shows the tradespace of all enumerated designs on a cost versus average test score scatter plot. Examining the tradespace in this way allows several important insights about the various alternatives to be observed. First, it can be observed that cost expenditures below 15 result in a steep decline in test performance. Conversely, cost expenditures about 50 show diminishing returns on further investments. Second, for each of the original 24 designs there exists a theoretical design concept at the same cost score that achieves higher test score performance. This implies that if the same level of resources were allocated differently theoretically higher test scores could be achieved without any additional cost expenditures. Alternatively, the same test scores could be achieved at lower cost expenditures.

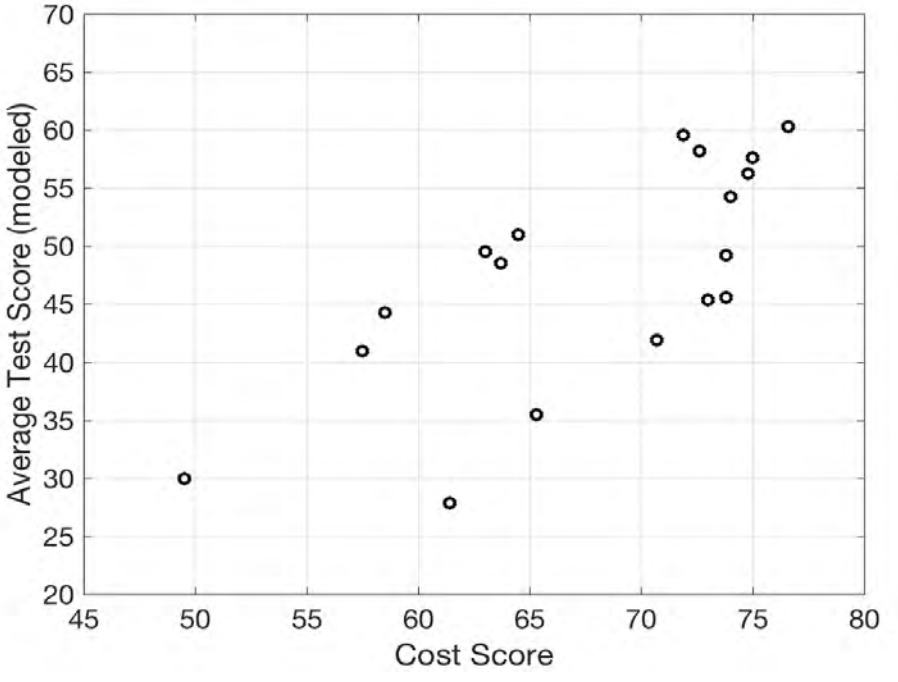

Figure 4. Tradespace of 150K school designs (gray points). Pareto optimal designs (black triangles). Original 24 actual designs (black circles)

CONCLUSIONS

The results from the case study described in this paper show the potential benefits and insights that can be derived from applying a tradespace exploration approach to the design of schools. Modeling school performance and the key factors that impact it parametrically allows a broader range of possible design choices to be explored. This enables decision-makers to select a design that yields the greatest benefits for a given investment. As shown in the case described here this allows decision-makers to potentially identify a more effective allocation of resources or determine when changes in total investment are likely to have a significant impact on desired performance.

A limitation of the current approach shown here is the assumption that decision-makers have a "blank slate" from which to select school design parameters. In reality, various additional constraints would be imposed by existing infrastructure, regulations, and other exogenous factors. Future research could relax these assumptions and build upon the basic methodology to enable the development of decision-making support tools that provide prescriptive guidance to school administrators and other stakeholders seeking to improve classroom performance.

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APPENDIX

The empirical model developed for this study can be expressed as follows:

3rd grade test scores = $a_1 + a_2*x_5 + a_3*x_2*x_6 + a_4*x_6*x_8 - a_5*x_6 - a_6*x_3*x_7$

5th grade test scores = $b_1*x_4 + b_2*x_5 + b_3*x_1 + b_4*x_8 + b_5*x_1*x_5 - b_6 - b_7* x_4*x_5 - b_8*(x_1^2)$

Cost score = $x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8$

Where $\mathbf{x_N}$ are the composite independent variables that describe the school and classroom characteristics (Table A1), and $\mathbf{a_N}$ and $\mathbf{b_N}$, respectively, are coefficients for the third and fifth grade test score models (Table A2 and A3). These coefficients were derived from the machine-learning algorithm that was used to determine the underlying regression model.

Table A1

Variable names for model independent variables

Variable	Name
x_1	Light
x_2	View
x_3	Color
x_4	Paths
x_5	Tech
x_6	Quiet
x_7	Display
x_8	Safety

Table A2
Coefficients for 3rd grade test score model

Coefficient	Value
a_1	44.3649610890026
a_2	2.51129941159534
a_3	1.26592538696679
a_4	0.721787209003415
a_5	16.9361574119665
a_6	0.239948773781894

Table A3
Coefficients for 5th grade test score model

Coefficient	Value
b_1	21.8213900739134
b_2	16.7906506111824
b_3	11.7025344365418
b_4	3.14960935810029
b_5	1.46096479555781
b_6	168.067628065439
b_7	2.9792013033419
b_8	1.6458063302796

JAMAICAN TEACHERS' PERSPECTIVES ON THE DESIRABILITY OF PERFORMANCE-BASED PAYMENT: LESSONS FOR EDUCATION POLICY MAKERS AND SCHOOL ADMINISTRATORS

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ABSTRACT

This paper examines the perspectives of Jamaican teachers on performance-based evaluation as a mode of compensation for Jamaican teachers. The paper is written against the backdrop of continued unsatisfactory results of the Jamaican EducationSystem. In 2015, having completed inspections of all 953 public schools, the National Education Inspectorate (NEI) found that 55% of schools were performing unsatisfactorily.

The study found, among other things, that approximately two-thirds of teachers agree or strongly agree that the performance of teachers and schools can be objectively evaluated. However, only approximately one-third held the view that the performance of the school could be the subject of performance-based compensation.

The findings of the study suggest that there is a gap between teachers' belief in the objectivity of the performance evaluation system and their readiness and willingness to embrace the idea of being held contractually responsible for the results realized and to be compensated accordingly. This finding points to the need for further dialogue between policy makers and practitioners on the issue of how to improve educational outcomes.

The study recommends that the major players in the education system – the Ministry of Education, the Unions representing teachers, and the University community, among others, convene a series of sessions to discuss the unsatisfactory outputs of the education system and develop strategies to improve both teacher and student performance and accountability. The study proposes that one of the strategies which may be considered is a performance-based payment system.

INTRODUCTION

There is a strong positive correlation between the academic performance of students and the quality of teaching and teachers. This view has been convincingly argued by Leithwood, Louis, Anderson, and Wahlstrom (2004) who found that the single most critical determinant of student performance is the quality of teaching and learning. The positions of Leithwood and his colleagues are corroborated by Goldhaber (2008) and Gentles (2016) who contend that investments in education, such as additional space to reduce class size and investments in technology are all trumped in their effectiveness by improvements in teacher quality.

The foregoing perspectives are endorsed by Hutton (2010) who identifies nine core qualities of effective school leadership; Fullan (2014) who explores three ways by which a principal can maximize his/her leadership effectiveness; and Davis, Darling-Hammond, LaPointe, and Meyerson (2005), who stress the overwhelming importance of teacher quality as the path to improved school performance.

If teacher quality plays such an overwhelmingly critical role in students' performance, then the skillful harnessing of the talents of teachers and the evaluation of their performance are indispensable to ensuring maximum impact of teacher quality on students' performance. Citing its

2005 report, the OECD takes two important platform positions. According to the report, gains in student learning are dependent on highly skilled and motivated teachers, on one hand, and effective monitoring and evaluation of teaching, on the other.

The question of how to evaluate teachers' performance and the perspectives of teachers on how their performance is evaluated have been the subject of unresolved debate for decades. In Jamaica, for example, the issue is raised each time the government and the unions representing teachers are to commence their wage and fringe benefits negotiations. While the issue of school "performance" is being debated at four levels, (the education system, individual schools and schools generally, teachers as a collective group, and students) the focus of this paper is primarily on the question of teachers' performance and whether there is justification for introducing performance-based payments and contracts (relative to their delivery of service and contributions to students' performance) and if so, what approaches should be adopted in framing those performance-based pay systems.

There is evidence of growing acceptance of the view that there is a relationship between students' performance and teacher quality — and by extension teachers' performance. The OECD (2005) indicates that in Chile, for example, teachers are rewarded collectively when they work in schools which are identified as high-performing by the National Performance Evaluation System of Subsidized Schools. In the continental United States, a significant number of states are using performance-based pay systems. Between 2007 and 2010 sixteen States had introduced merit pay. Since 2011, several others have introduced the system. Koretz (2009), who characterizes the issue as being centrally about accountability, notes that the policy of rewarding teachers and schools for students' test scores has become a corner stone of educational policy in the United States of America since the 1990s, but he critiques existing performance pay systems as being simplistic.

Citing Springer (2009), Jensen, Yamashiro and Tibbetts (2010) suggest that there is visible support for linking teacher quality and compensation, based in part on the weak links between teacher experience and educational credentials and student achievement. Chiat and Miller (2009) see the need for attention to be paid to improving the compensation of teachers in order to retain skilled teachers, while Heneman, Milanowski, and Kimball (2007) point to the relationship between equitable teacher compensation and development and increased teacher engagement. Conley and Odden (1995), Heneman et al. (2007), and Mohrman, Mohrman, and Odden (1996) are persuaded that there are several models including skill-based pay, individual-based performance, school-based performance and plans that combine all the key ingredients to produce effective teacher performance-based pay systems.

The workability and efficacy of performance-based pay systems are dependent on how acceptable and respected the overall performance-based system is. However, there is a virtually settled universal opinion that the quality of teaching is the single most critical variable in student performance (Liethwood et al., 2004). There is also a global concern that a significant number of students are underperforming, and in some countries, for example Jamaica, 55% of schools have been found to be performing unsatisfactorily, (National Education Inspectorate, 2015). Given the globally accepted position that quality teaching affects students' performance, on one hand, and the unacceptably high levels of students who are underperforming academically in several countries, on the other, and having regard to the critical role of teacher performance evaluation, between the two, this research seeks to uncover the perspectives of Jamaican teachers on the performance evaluation system being used in the public education system in Jamaica.

THE PROBLEM

Despite a large and growing number of jurisdictions implementing performance-based evaluation systems, there is strong skepticism about their efficacy. Castro Ramos (2009) in an OECD report points to the complexity of teacher evaluation systems, posits that the fact of complexity does not mean that attempts to implement performance-based evaluation systems should be abandoned. According to Ramos, factors such as societal attitudes, the school system, the media, and general perceptions of schooling and teachers, all influence the design of teacher evaluation policies. An exceedingly critical factor that must inform the design of teacher evaluation systems is the attitudes and perspectives of teachers themselves. Any successful linking of pay and promotion to performance, the latter two being among the most important values to every employee – including teachers – will be founded on a strong belief in the fairness and objectivity of the overall performance evaluation system.

In arguing the case for a more rigorous performance evaluation system, Hull (2013) laments that the problem with most teacher-evaluation instruments is that they simply seek to determine whether a teacher's performance is satisfactory or not. Hull's critique was echoed by Jamaica's former Minister of Education (2012 – 2016) and the current Opposition Spokesperson Education, Ronald Thwaites, who dismisses the current practices in teacher evaluation in Jamaica as being ineffectual, given that they do not provide a reliable and credible mechanism to enable school administrators and the Ministry of Education to hold underperforming teachers accountable. Thwaites contends that unless the teacher evaluation can enable the authorities to effectively distinguish between good and bad teachers and ensure accountability, the system is useless. Having regard to the relationship between teacher quality and student performance and the need for teacher to buy-in to any system that seeks to evaluate their pedigree (quality) and their performance, particularly as these affect pay and promotion, this study seeks to understand the perspectives of Jamaican teachers on the performance evaluation system in the public education system.

OBJECTIVES OF THE STUDY

Three objectives drive the study:

(a) To understand Jamaican teachers' perspectives on the objectivity of the performance evaluation system;
(b) To ascertain teachers' views on the responsibility of school leaders for the performance of the school;
(c) To canvass teachers' opinions of whether their compensation should be linked to students' performance

RESEARCH QUESTIONS

Consistent with objectives of this study, three questions are explored, namely:

(1) What are teachers' perspectives on the objectivity of performance evaluation system?
(2) Should the leadership of a school be held responsible for the factors that drive performance in the school?
(3) What are the key elements of a performance-based evaluation which is tied to compensation?

SIGNIFICANCE OF THE STUDY

The study is significant for at least three reasons, namely:

(a) It reengages discussion on an issue about which the Jamaican public in general and the stakeholders in the education system have been somewhat equivocal, shy, combative, or defensive. The paper is designed as an inducement to discuss an issue that many appear unwilling to even mention.

(b) The paper provides evidence of the position and expectations of teachers regarding performance-based compensation and thus indicates the parameters within which administrators and policy makers will need to frame the policy and planning debate.

(c) The discussion on how the education system treats with the issues of teacher quality, student performance, and teacher evaluation is relevant, given the challenges facing the education system.

LITERATURE REVIEW

Hull (2013) asserts that teacher evaluations have, for decades, been virtually meaningless bureaucratic exercises that have failed to distinguish between excellence and mediocrity. Wagner (2013) cites the example of the state of North Carolina which had replaced tenure contracts with performance-based contracts. The Bill to replace the tenure system with performance-based contracts was piloted by Senator Phil Berger who argued that the tenure system does not remove bad teachers from the classroom and in many respects rewarded mediocrity and punished excellence by granting unlimited job security to all. The concerns of the North Carolina Senator are endorsed by the findings of a TIME magazine poll released in September 2010, which found that 71 percent support the idea of paying teachers based on their effectiveness in the classroom.

Performance-based Contracts

The use of performance-based contracting and compensation is not novel. The issue really revolves around whether the practice, as it has emerged in various areas of public procurement and contracting, is applicable to the teaching and learning. While it is to be acknowledged that measuring performance in education is complex, there are parallels between the principles of performance measurement under performance-based contracts generally, and those in education.

Performance-based contract, as a method by which governments procure services, have become an increasingly popular method of procurement and is being used in several sectors as Loevinsohn (2008) notes. The key feature and fundamental purpose of performance-based contracting, as Loevinsohn explains, is that it enables government agencies to acquire services using contracts which stipulate what is to be achieved and not necessarily how the work is done. According to Loevinsohn, performance-based contracting by emphasizing results, rather than processes, creates the space for innovation on the part of the contractor while providing the government with the benefit of receiving best-value products and services. Loevinsohn identifies three critical elements of performance-based contracts, two of which are features of school improvement planning:

(a) A clear definition of a series of objectives and indicators by which to measure the contractor's (principal's/teacher's) performance

(b) Collection of data on performance indicators to assess the extent to which the contractor is successfully implementing the agreed services and attaining the planned deliverables.

Key Factors that Determine School Performance – Concerns and Cautions

The factors that determine the performance of schools are many and varied and relate not only to teachers and the quality of leadership but include factors such as resources, the support and influence of the community, and the support of past students (Mulford, 2003). In considering the mechanics of implementing a performance-based evaluation and compensation system, some teachers are understandably skeptical and indeed fearful as they are of the view that an unfair School Board could create the means to dismiss them without justification and place on them the burden of having to fight for their rights. These concerns cannot be dismissed as being without foundation, but the probability of that happening cannot be used to allow the status quo to remain.

Koretz (2009) takes note of the attempts to justify pay for performance in schools by referencing practices in the private sector. He cautions, however, that pay for performance in the private sector is hardly based on numerical measures, arguing that economists have found that for many occupations (particularly, professionals with complex roles), the available objective measures are seriously incomplete indicators of value to firms, and therefore, other measures, including subjective evaluations are considered as part of the pay for performance.

Williams and Engel (2013) of the George Washington University found that teacher evaluation is used for both accountability and instructional improvement in most school systems; and observe a growing trend to use student test results and metrics to inform accountability for schools, principals, and teachers, instructional improvement in classrooms and schools, and reforms at the system level. Williams and Engel identified four primary approaches to accountability, namely: professional, organizational, market, and parental/community. They suggest that each approach has strong implications for teacher evaluation and its use in instructional improvement. In expounding on the issue of accountability, Williams and Engel highlighted the Finnish system pointing out that the Finland's teacher evaluation system is based almost entirely on professional accountability. Under this system, teachers are accountable to each other, the school, the children, and their parents. Williams and Engel note that the Finns abolished the school inspection system in the early 1900's and replaced it with an evaluation system that is more group-based, reflective, and participatory, with the aim of creating professional learning communities among teachers and administrators (Sahlberg, 2011).

Practice Models in Performance-based Compensation Systems

One of the strategies that several countries have adopted to reward teachers and to distinguish between high performing and mediocre teachers is performance-based pay systems. Walker (2013), in looking at teacher evaluation systems across several countries, found that in many countries teacher evaluations systems are a work-in-progress and of the 28 countries surveyed in the OECD report, 22 have formal policy frameworks in place at the national level to regulate teacher evaluations.

The key issues around which the debate about performance-based pay systems now revolves are, (a) whether they work, that is, whether they result in improved student performance, and (b) whether instances of inconclusive results are related to factors such as the administration of the systems as against the potential efficacy of the systems themselves. In this regard, we consider the cases in some countries.

Finland. Though having one of the world's most successful education systems, the Ministry of Education in Finland plays no role in teacher evaluation, instead, broad policies are defined in the contract with the teachers' union (Sahlberg, 2011). These contracts give the local school principal extensive powers over the performance of teachers who are typically evaluated

against the national core curriculum and the school development plan. Finland does not use standardized testing, so it is impossible to use individual student test scores to evaluate teachers. Using the School's Development Plan as a reference point and the contract of employment, teachers who do not perform acceptably are eventually removed from the system.

But the teacher evaluation system in Finland is ultimately a consultative and formative process, as Williams and Engels (2013) indicate. While there can be negative performance consequences, the emphasis is on collaboration and support. Principals often use their own knowledge and experience as teachers to assist teachers and help them recognize areas of strengths and improve areas of weakness. Thus, poor performance represents a violation of professional norms and violates the trust that characterizes the system. In Finland, parents are free to choose the school to which they send their children. But whatever school they choose the quality is the same.

According to Partanen (2011), since the 1980s, the main driver of Finnish education policy has been the idea that every child should have the same opportunity to learn, regardless of family background, income, or geographic location. Education has been seen first as an instrument to even out social inequality. It is instructive that while Finland does not use standardized testing nor has a sector-wide teacher evaluation system it maintains the highest standards of accountability and performance globally.

Singapore. Steiner (2010) argues that countries that wish to see radical improvements in their education systems should look to nations, like Singapore, that have revamped teacher performance measurement to sustain teaching excellence. The Singapore system which was introduced in the early 2000's enables measurement of teachers in all subjects and grades.
According to Steiner, one element of the Singapore model that stands out, "is the development and thorough use of performance-linked competencies to measure, reward, and develop teacher performance."

The Singapore system enjoys the support of teachers, school administrators, policy makers and the public despite having an ethnically diverse Asian population. As a result of the rigorous and successful system, Singapore boasts some spectacular educational outcomes, including, ranking in the top five in major international exams, and copping first place on several occasions.

The key to the success of the Singaporean system is that they emphasize the building of teacher competencies and having fully equipped teachers for the task and requiring them to engage in continuous professional development, they hold them accountable for the performance of their schools. Thus, competencies are used in conjunction with performance outcomes to evaluate, promote, and pay teachers.

Denver, Colorado and Washington D.C. The two most well-known performance-based pay plans, according to Lohman (2011), are the systems used in Denver and Washington, D.C., both of which were implemented as part of collective bargaining agreements between the school district and its teachers and which make participation voluntary. Other key features of the systems in Denver and D.C. are that they use a combination of annual bonuses and increases in teachers' base pay and offer bonuses for increasing students' academic achievement.

The Denver system, known as ProComp, went into effect in 2006 after a four-year pilot program in 12 of Denver's 142 schools. It is a district-wide compensation program designed through a partnership of the teachers' union and the school district, and covers classroom teachers and other special instructional personnel, such as librarians, counselors, and therapists. The system was made optional for teachers already working for the school district when the program became effective, but mandatory for those who were employed on or after January 1, 2006. Features of the system include an initial base salary, based on the district's traditional salary schedule, plus raises and

bonuses. These bonuses were based on four main factors, namely: (1) the school's and students' academic performance and growth, (2) teachers' qualifications and specifically advanced degrees and professional-development units earned, (3) performance evaluation ratings, and (4) special conditions such as teachers working in hard-to-staff schools or subjects. (Lohman, 2011).

A 2008 study of the ProComp program found no solid evidence that ProComp teachers had improved student achievement over those teachers who did not participate in the ProComp program. The findings of this evaluation appeared to have left the authorities worried that the initiative was not having the desired effect. It was, however, recognized that two years was too short a time in which to see marked improvements. The 2010 evaluation found, among other things, that there was substantial growth in mathematics and reading achievement, that teachers hired after the program was implemented (and who therefore were mandated to join the programme) exhibited higher first-year achievement than those hired prior to the programme. The evaluation also found that teachers who had voluntarily opted into the ProComp program slightly outperformed their non-participant colleagues, though the differences were less pronounced when adjusted for individual differences between teachers who chose to participate and those who did not. The 2012 Evaluation report showed further improvements in mathematics though there were declines in reading and writing.

The Center for Education Reform (2010) conducted a study on various performance-based systems in the United States. The study entitled, *Making the Grade? A Report Card on Performance Programs across the US,* gave a grade of "C" to the Denver system. The Center's basic assessment of the Denver system was that the program is a step in the right direction but that there was not enough emphasis on student achievement. The Washington system was given a "B minus" grade in 2010 by the Centre for Education Reform, with the comment that the program's salary increases are attractive and thus the system retains teachers. The report concluded that the program is the country's closest to what the report described as a true performance-based pay system.

Delaware, Georgia, North Carolina, Tennessee, and Texas. Shakman, Riordan, Sánchez, Cook, Fournier, and Brett (2012), conducted a study of performance-based teacher evaluation systems in five States (Delaware, Georgia, North Carolina, Tennessee, and Texas) and found, among other things, that, "all five states include observations and self-assessments as part of teacher assessment, but States differ in who conducts the observation, how often evaluations are conducted, and what scoring parameters are used." Four of the five introduced performance-based evaluations within the last decade but Texas introduced this system in 1997/98. The dominant and common features of these systems are teacher quality and preparedness, professional growth, student achievement, and planning.

Oakes and Robertson (2014) conducted a study on teachers' perceptions of the North Carolina system and found, among other things, that while over two-thirds of teachers agreed with their evaluation, less than 25 per cent agreed that the process would help them improve their teaching or student achievement. Seventy per cent said the process took more effort than the results are worth. In Texas the system was reported as showing positive results in the area of teacher retention but no evidence that it fostered student achievement.

Summary

The literature shows that several jurisdictions implemented performance-based compensation systems in schools. These systems have similar elements, but there are several unique features. While there is unease among teachers in some jurisdictions concerning the objectivity and trustworthiness of the system, there is confidence and support among others. In some cases, some jurisdictions have acted to improve on the original design in direct response to teachers' concerns.

The picture that has emerged is that performance-based compensation systems are works in progress and are fraught with complexities but are nonetheless necessary interventions designed to improve students' outcomes. The emerging picture also confirms that given the critical importance of teacher quality to acceptable student outcomes, teacher compensation tied to performance is a critical issue for policy makers and educational planners to consider.

METHODOLOGY

Research Design

The research uses a descriptive non-experimental quantitative design. According toCreswell (2013), quantitative designs are used when a researcher wishes to explore relationships between variables and intends to generalize, relating to a large population. Specifically, for this study, a descriptive design provides a description of the current status of an identified phenomenon and provides a systematic assessment of said phenomenon: as in this case, "teachers' perspectives of the performance-based evaluation system."

Sample

The sample for this study consisted of one hundred and fifty-one (151) teachers, although in some instances fewer than the 151 responded to all the items on the questionnaire. As can be seen in Table 1, there were 148 respondents, and in Table 2, 149 respondents. The sample was drawn using a convenience sampling technique. It is to be noted that participants were not selected based on the school in which they worked, however the sample was drawn from nineteen (19) educational institutions located across Jamaica, involving seven (7) schools whose performance was generally good and the remaining eleven (12) being fair to low.

The gender, age cohorts, years of experience, professional qualification, management or non-management status, and highest level of qualification of the sample teachers are shown in Tables 1, 2, and 3. With respect to gender, 75% of the sample were female and this is consistent with the teaching population which consists of one male for every three females. In relation to age, 62% are in the cohorts of 31 – 40 and 41 – 50 years, which is again consistent with the general population. The other demographics also reflect the distribution of the general population and qualifications which show that only about 25% have a master's or doctoral degree.

Table 1

Gender and the Age Group of Teachers

		Age Group					
		Under 20 years	20-30 years	31-40 years	41-50 years	51-60 years	Total
Gender	Male	2	11	15	4	4	36
	Female	1	24	47	29	11	112
Total		3	35	62	33	15	148

Table 2

Gender and Teachers' Years of Experience

		Teacher with less than 5 years' experience	Teacher with 6-10 years' experience	Teacher with 11-15 years' experience	Teacher with 16-20 years' experience	Teacher with over 20 years' experience	Total
Gender	Male	8	13	8	3	4	36
	Female	18	34	20	13	28	113
Total		26	47	28	16	32	149

Table 3

Teachers' Highest Level of Professional Qualification and the Current Positions

		Current position					
		Prin.	Vice prin.	HoD	Grade S/visor	Class/ Subject Teacher	Total
Highest professional qualification	Diploma	0	0	0	5	20	25
	Bachelors	1	2	8	16	65	92
	Masters	0	2	6	7	15	30
	Postgrad Certificate	0	0	0	0	2	2
Total		1	4	14	28	102	149

Data Collection Instrument

The data were collected using a self-developed performance-based evaluationquestionnaire. The items in the questionnaire were largely constructed by the primary researcher and informed by issues in the literature on performance evaluation. This instrument consisted of twenty (20) items measured on a five-point agreement response format Likert scale with 1 being 'strongly disagree', 2 'disagree', 3 'undecided', 4 'agree' and 5 being 'strongly agree'. Additionally, there were eight (8) demographical questions that recorded the teachers' age, gender, position at school, highest level

of professional qualification, years of experience, years of experience at current school, the level at which they teach, as well as, the type of school at which they teach.

Reliability and Validity

The instrument was pilot tested among a group of thirty aspiring principals and analyzed using Cronbach's Alpha (C-Alpha). The original instrument had twenty-four Likert items and based on the results an item analysis conducted on the pilot four items were removed due to their generation of low item-total correlations. The C-Alpha produced a reliability score of .784 which was deemed to be a strong indicator of reliability. This assessment is based on the positions of Nunnally (1978), Rosenthal and Rosnow (1991), and Drost (2011) who argue that a C-Alpha score in the region of, or close to .9, suggests a high degree of level of reliability.

The degree to which the instrument can be relied upon to accurately measure the issues examined in the research questions is verified by the extent to which the instrument covers the key variables in the scientific literature. According to Trochim (2006), the issue of construct validity revolves around the degree to which a concept or idea is translated into a functioning and operating reality. The size and scope of the sample provided the level of representativeness which would support the generalizability of the findings. The representativeness of the sample is critical to supporting the validity of the findings.

Data Collection Procedures

The instrument was distributed to the schools that had been conveniently chosen. These schools were chosen based on the primary researcher's access to those schools having taught some teachers at those schools in either a graduate program or professional development program or both. These graduate students served as points of contact and research assistants. A total of 200 questionnaires were distributed with 151 returned constituting a 75.5% response rate.

Data Analysis Techniques

The data were analyzed using the Statistical Package of the Social Science (SPSS) version 21.0. Data were entered and coded and cleansed for analyses. Several analyses were conducted in relation to the results: frequency analyses, an exploratory factor analysis, and a Pearson's R product moment correlation coefficient test. Frequency analyses were used to decide how many teachers responded to a specific response option as it relates to specific questions. An exploratory factor analysis allowed for the generation of key factors associated with the performance-based evaluation scale which in turn allowed the researcher the opportunity to perform the Pearson R product moment correlation coefficient test. This test assessed the magnitude and direction of the relationship of the factors associated with the performance-based evaluation scale.

RESULTS

Research Question # 1: What are teachers' perspectives on the objectivity of the performance evaluation system?

In answering this question, data from four items of the dataset which focused on teachers' perceptions of the performance evaluation system were summarized to generate the findings. The items stated:

(a) Their performance can be objectively evaluated;
(b) A school's performance can be objectively evaluated;
(c) The performance of a school could be the subject of a contractual agreement; and
(d) The factors that affect the performance of a school can be objectively identified.

In examining the first item, the study found that less than one-quarter of the sample (23.6%) strongly disagreed or disagreed that teachers' performance can be objectively evaluated, while less than one-tenth (9.5%) said they were unsure; thus, the remaining two-thirds (66.9%) either agreed or strongly agreed that the performance of teachers can be objectively evaluated.

A somewhat similar set of findings were made in relation to the second item. The findings here show that a slightly lower number of 22.4% either disagreed or strongly disagreed that a school's performance can be objectively evaluated, while 8.8% were unsure, and 68.9% agreed or strongly agreed.

While most teachers agreed or strongly agreed that both individual teachers' performance and a school's performance can be objectively evaluated the picture was different when they were asked the performance of the school could be the subject of a contractual agreement. Those disagreeing or strongly disagreeing remained in the same general percentage when compared to the two previous items with 21.4% in this instance. However, those who expressed that they were unsure swelled to almost five times the numbers in the previous two items coming out at 40%. Those who agreed or strongly agreed was 38.6%.

In relation to the fourth item used, nearly three-quarters (74.8%, of which 66.7% accounted for 'agree'), either agreed or strongly agreed that the factors that affect a school's performance can be objectively identified. Just over 15% disagreed or strongly disagreed, with the number saying they were unsure being in the same general area as the first two items at 10.4%.

Research Question # 2: Should the leadership of a school be held responsible for the factors that drive performance in the school?

A single item provided the answer to the second research question. This question sought to determine whether teachers were of the view that the leadership of the school should be held responsible for the factors that drive the school's performance. The findings are disclosed in Table 4 which show that an overwhelming majority, 80.2%, agreed or strongly agreed that the leadership should be held responsible. This finding is instructive, and it shows that teachers are looking to leaders to exercise a level of activism in driving school performance.

Table 4

Leadership of the School being held Responsible for the Factors that Drive Performance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	3.3	3.4	3.4
	Disagree	15	9.9	10.3	13.7
	Undecided	9	6.0	6.2	19.9
	Agree	68	45.0	46.6	66.4
	Strongly Agree	49	32.5	33.6	100.0
	Total	146	96.7	100.0	
Missing	System	5	3.3		
Total		151	100.0		

Research Question # 3: What are the key elements of a performance-based evaluation which is tied to compensation?

The third research question explores the key factors associated with the performance-based evaluation and sought to establish whether a relationship exists between these factors or not. Five factors were identified through the process of an exploratory factor analysis. The factors generated are identified as Confidence in Fairness (Factor 1), System of Evaluation (Factor2), Annual Assessment (Factor 3), Accountability (Factor 4), and Objectivity (Factor 5), as seen in Table 5. These 5 factors have accounted for 60.188% of the total variability in the data.

Additionally, the relationship between each factor ranged from insignificant to moderately weak positive relationships (see Table 6). There was no significant relation between the following: objectivity and confidence in fairness, objectivity and system of evaluation, objectivity and annual assessment, objectivity and accountability, system of evaluation and accountability, as well as, confidence in fairness and accountability. However, there were weak or moderately weak positive relationships between: confidence in fairness and system of evaluation, confidence in fairness and annual assessment, as well as, system of evaluation and annual assessment.

Table 5

Rotated Component Matrix of the Factors Associated with Performance Based Evaluation.

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
You have confidence in the fairness of the board of management of your school	.836				
To the best of your knowledge most of your colleagues have confidence in the fairness of the board of management of your school	.771				
To the best of your knowledge most of your colleagues have confidence in the fairness of the principal of your school	.745				
Teachers at your school who perform excellently are recognized	.537				
You are comfortable with the current system of teacher evaluation		.872			
The current system of teacher evaluation is working well		.849			
To the best of your knowledge, most of your colleagues are comfortable with the current system of teacher evaluation		.752			
A school's performance can be objectively evaluated			.938		
Teachers' Performance can be objectively evaluated			.926		
The factors that affects the performance of a school can be objectively identified			.843		
Your performance is assessed every year				.845	
To the best of your knowledge the performance of your colleagues on staff at your school is assessed every year				.837	
You have received feedback on the suggestions you have made to improve the system of teacher performance evaluation				.496	
You are satisfied with your performance				.451	
The planned performance of a school could be the subject of a contractual agreement					.643
You would support a performance-based teacher evaluation if you are satisfied that the mechanisms for evaluating performance are fair					.547
The leadership of a school should be held responsible for the factors that drive performance over which the school has control					.478
You believe that teachers who perform excellently should be rewarded accordingly					.470
Teachers at your school who perform poorly are subject to disciplinary action					.417

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]
a. Rotation converged in 7 iterations.

Table 6

Showing the Relationship between the Factors Associated with Performance Based Evaluation

Correlations

		Objectivity	Confidence in Fairness	System of Evaluation	Annual Assessment	Accountability
Objectivity	Pearson Correlation	1	.093	.075	.091	.139
	Sig. (2-tailed)		.263	.363	.271	.091
	N	148	148	148	148	148
Confidence in Fairness	Pearson Correlation	.093	1	.278**	.397**	.103
	Sig. (2-tailed)	.263		.001	.000	.207
	N	148	151	151	151	151
System of Evaluation	Pearson Correlation	.075	.278**	1	.351**	.065
	Sig. (2-tailed)	.363	.001		.000	.426
	N	148	151	151	151	151
Annual Assessment	Pearson Correlation	.091	.397**	.351**	1	.130
	Sig. (2-tailed)	.271	.000	.000		.111
	N	148	151	151	151	151
Accountability	Pearson Correlation	.139	.103	.065	.130	1
	Sig. (2-tailed)	.091	.207	.426	.111	
	N	148	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

There is broad consensus that strategies to improve teacher quality and performance, on the one hand, and student achievement, on the other, are critical to the advancement of nations and the global society and economy. Many jurisdictions have sought to address the problem of school underperformance and teacher quality by introducing performance-based teacher evaluation systems. These jurisdictions include countries such as Denmark, Finland, Iceland, and Singapore, which are regarded as regarded as being among the more successful pay systems, according to Walker (2013). Other jurisdictions include various States in the United States of America of which the Denver ProCom is rated as being among the most successful, according to Wiley, Splindler, and Subert (2010). There is also the expanding practice of governments using performance-based contracting to secure public service (Loevinsohn, 2008).

The key elements of these systems that have been rated as successful are accountability, according to Walker (2013) and Koretz (2009); objectivity (Steiner, 2010); regard for the opinions of teachers on the effectiveness of the system (Williams & Engels, 2013); ongoing tweaking (Eurydice, 2008), and fairness in meeting out rewards and consequences depending on outcomes, as outlined by Hendrickson (2012) and Partanen (2011).

The findings of this study support the general direction of the literature. In Table 4 it is shown that the major issues about which teachers are concerned with respect to a performance-

based evaluation system are objectivity, fairness, and accountability. The insight that these findings highlights is self-evident, namely, that the credibility of a performance-based evaluation system rests with these three factors, primarily.

It is instructive that while the study found that a majority of teachers (about two-thirds) held the view that it is possible to assess the performance of schools and teachers objectively, and that the leadership of the school should be held responsible for the factors affecting performance over which they have control, there was no clear majority in support of the idea of performance-based contracting with the category 'unsure' accounting for the largest block of responses, at 40%. This suggests that although teachers believe performance can be objectively measured, they are not confident that the risks of a performance-based system are likely to be overcome by pure objectivity. The lack of support for performance-based contracting may also be an indication that teachers do not have confidence in the fairness of the system.

CONCLUSIONS

This study sought to answer three questions, namely:

(1) What are teachers' perspectives on the objectivity of performance evaluation system?
(2) Should the leadership of a school be held responsible for the factors that drive performance in the school?
(3) What are the key elements of a performance-based evaluation which is tied to compensation?

The findings show that 66.9% either agreed or strongly agreed that the performance of teachers can be objectively evaluated. A similar percentage 68.9% agreed or strongly agreed that a school's performance can be objectively evaluated. Given the background data which show that 55% of Jamaican schools are performing unsatisfactorily, these findings suggest that there is an opportunity to reengage public discussion on the issue of teacher (and school) performance with stakeholders across the spectrum of Jamaican society. While the issue is likely to evoke pushback from some sectors and some stakeholders, the state of the education system suggests that it is not a matter about which policy makers can be any longer equivocal or shy.

It is to be further noted that given the percentages of teachers who believe in the possibility of objectively assessing teachers' and schools' performance, and having regard to the key factors which were found to highlight their major concerns, namely, confidence in fairness (Factor 1), system of evaluation (Factor 2), annual assessment (Factor 3), accountability (Factor 4) and objectivity (Factor 5), (which factors account for 60.188% of the total variability in the data), the paper has provided ample indications of what teachers expect should be the parameters of a performance-based compensation system and thus provides a roadmap for policy-making and educational planning.

The foregoing findings also put in context other findings which show that a majority of teachers hold that the leadership of schools should be held responsible for the factors that affect school performance but, somewhat strangely enough, most teachers (40%) are unsure about, and 38.6% strongly disagreeing or disagreeing about whether teachers' performance should be the subject of contractual agreement. The study also found that 80.2% agreed or strongly agreed that the leadership should be held responsible for the factors that affect a school's performance. These findings collectively point to the need for discussion among stakeholders on the broader philosophical and strategic planning questions of how the education system treats with the issues of teacher quality, student performance, and teacher evaluation in face of the challenges facing the Jamaican education system.

RECOMMENDATIONS

Based on the findings of this study, three recommendations are made as follows:

(a) Given performance problems faced by the Jamaican education system and the perspectives of teachers regarding objectively evaluating teachers' and schools' performance, it is recommended that policy makers advance the dialogue with teachers and teachers' unions concerning how to strengthen the elements of the performance evaluation system in which teachers' have confidence in order to expand the pool of support for the system.

(b) Taking account of the practice in performance-based compensation in several jurisdictions, countries, like Jamaica, which face severe performance problems, education systems are urged to look carefully at models and assess the experiences of those jurisdictions before seeking to implement policies of performance-based compensation.

(c) Based on the finding that most teachers in Jamaica are not in support of performance-based compensation, government should exercise caution and ensure that there is extensive consultation and a ground-swell of buy-in before seeking to implement.

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APPENDIX 1

QUESTIONNAIRE - TEACHERS' PERSPECTIVES ON PERFORMANCE-BASED TEACHER EVALUATION SYSTEM

Dear Colleague: Thanks for agreeing to participate in this research. Your answers to the question below will help to inform my understanding on the perspectives of teachers on the use of teacher performance-evaluation. It will take you less than ten minutes to complete this questionnaire.

SA = Strongly Agree; A = Agree; U = Undecided; D = Disagree; SD = Strongly Disagree

	SD	D	U	A	SA
(1) Teachers' performance can be objectively evaluated.					
(2) A schools' performance can be objectively evaluated.					
(3) The planned performance of a school could be the subject of a contractual arrangement.					
(4) The factors that affect the performance of a school can be objectively identified.					
(5) The leadership of a school should be held responsible for the factors that drive performance over which the school has control					
(6) You have confidence in the fairness of the principal of your school					
(7) You have confidence in the fairness of the board of management of your school					
(8) To the best of your knowledge most of your colleagues have confidence in the fairness of the principal of your school					
(9) To best of your knowledge most of your colleagues have confidence in the fairness of the board of management of your school					
(10) You would support a performance-based teacher evaluation if you are satisfied that the mechanisms for evaluating performance are fair					
(11) You believe that teachers who perform excellently should be rewarded accordingly					
(12) The current system of teacher evaluation is working well					
(13) You are comfortable with the current system of teacher evaluation					
(14) To the best of your knowledge most of your colleagues are comfortable with the current system of teacher evaluation					
(15) Your performance is assessed every year					
(16) You are satisfied with your performance					
(17) To the best of your knowledge the performance of your colleagues on staff at your school is assessed every year					
(18) Teachers at your school who perform poorly are subject to disciplinary action					
(19) Teachers at your school who perform excellently are recognized					
(20) You have received feedback on the suggestions you have made to improve the system of teacher performance evaluation					

PLEASE DESCRIBE YOURSELF BY ANSWERING THE FOLLOWING QUESTIONS

(21) Your age group is:

- (a) Under 20 years [ ]
- (b) 20 – 30 [ ]
- (c) 31 – 40 [ ]
- (d) 41 – 50 [ ]
- (e) 51 – 60 [ ]

(22) You are a:

- (a) Teacher with less than 5 years' experience [ ]
- (b) Teacher with 6 – 10 years' experience [ ]
- (c) Teacher with 11 – 15 years' experience [ ]
- (d) Teacher with 16 – 20 years' experience [ ]
- (e) Teacher with over 20 years' experience [ ]

(23) You teach at what level?

- (a) Early Childhood [ ]
- (b) Primary [ ]
- (c) Secondary [ ]
- (d) Tertiary [ ]

(24) You have been at your current school for:

- (a) 5 years or less [ ]
- (b) 6 – 10 years [ ]
- (c) 11 – 15 years [ ]
- (d) 16 – 20 years [ ]
- (e) Over 20 years [ ]
- (f) Not applicable [ ]

(25) Your highest professional qualification is:

- (a) High School Graduate [ ]
- (b) Diploma [ ]
- (c) Bachelor's Degree [ ]
- (d) Master's Degree [ ]
- (e) Postgraduate Cert in Education [ ]
- (f) Doctorate [ ]

(26) Your position at your school is

- (a) Principal [ ]
- (b) Vice Principal [ ]
- (c) Head of Department [ ]
- (d) Grade Supervisor [ ]
- (e) Classroom / Subject Teacher [ ]

(27) Your school is a

- (a) Traditional High [ ]
- (b) Upgraded Secondary [ ]
- (c) Primary and Junior High [ ]
- (d) Primary [ ]

(28) You are:

- (a) Male [ ]
- (b) Female [ ]

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