EDUCATIONAL PLANNING

Vol. 24 No. 4

The Journal of the International Society for Educational Planning
PROMOTING THE STUDY AND PRACTICE OF EDUCATIONAL PLANNING

International Society for Educational Planning

Reprints: Articles and reviews are available from the editor. Please contact the editor for availability and costs.
Translation: Educational Planning will attempt to provide readers with major language translations of journal articles. Interested members should contact the editor regarding availability and costs.

Educational Planning is the refereed journal of the International Society for Educational Planning (ISEP). Educational Planning is published quarterly by ISEP which maintains editorial office at 2903 Ashlawn Drive, Blacksburg, VA 24060-8101. The Journal is assigned ISSN 1537-873X by the National Serials Data Program of the Library of Congress. For manuscript submission and membership information please see submission of manuscripts. The journal is indexed in the H. W. Wilson Education Index and the articles are part of the EBSCO Database.

EDUCATIONAL PLANNING

A JOURNAL DEDICATED TO PLANNING, CHANGE, REFORM, AND THE IMPROVEMENT OF EDUCATION

VOLUME 24 NUMBER 4

2017

FROM THE EDITORS

Educational planning articles in this issue explore planning issues and challenges that face stakeholders in the K-12 system that inevitably impact student success. These studies include: the examination of a pilot program in Ontario, Canada that prepares students as early learners for the formal school system; a study that took place in the United States that explores the variables that impact the attitudes and success of students and teachers in high school science classrooms; a review of the gap between digital natives (students) and digital immigrants (teachers) and how to bridge the divide to create a more effective classroom environment; and, a study from Jamaica that examines the perceptions of male students related to their relationships with their principals and teachers.

First, Black and Cantalini-Williams examined a pilot program known as Family and Community Engagement Strategy (FACES) that took place in three Ontario, Canada communities. This coordinated community-based model was designed to increase and expand the opportunity for all children to be school ready prior to joining the formal school system. They found that focused and shared leadership, flexibility, and trust were critical to the success of the projects. Implementation of strategies that met the unique needs of each pilot community resulted in greater family involvement in supporting their children as they transitioned to school.

Then, Ford and Alsup explored the relationship between high school science teachers' perceptions of the school's science environment (instructional equipment, demonstration equipment, and physical facilities) and ninth grade students' attitudes about science (enjoyment, boredom, and perceived value of science). The study showed a relationship between science classroom conditions and students' attitudes with demonstration equipment having an important impact.

This is followed by Riegel and Mete who observe that there is a significant gap between those who have grown up with technology (digital natives) and those who have not (digital immigrants) noting that the gap highlights stigmas and stereotypes associated with each group. The authors suggest that there is an opportunity for both digital natives and digital immigrants to reduce stigmas and stereotypes by supporting and learning from one another thereby create more effective learning environments for all stakeholders.

Finally, Thompson examined the phenomenon of the underperformance of male students in Jamaican schools and the concerns this raises in terms of potential threats to society. By examining the dynamic of the school system, the study seeks to understand the boys' perceptions of the quality of their relationships with their principals and teachers as compared to the girls' perceptions. The data demonstrated consistently weaker performance on the part of male students when compared with that of girls. In addition, boys expressed adverse opinions about the quality of their relationship with their principals. In planning for improved boys' academic performance, providing a more caring, inclusive, supportive, and male friendly learning environment for boys requires consideration.

The authors of these articles have demonstrated the need for effective educational planning at all levels of elementary and secondary education. Whether planning with community-based stakeholders to prepare students for formal education, planning for resource allocation to ensure appropriate equipment and facilities are created for science classrooms, planning for digital natives that will now inhabit our learning institutions, or developing planning strategies for the growing marginalization of male students, it is clear that effective and thoughtful planning is the common process that is critical for the success of all students.

Editor: Tak Cheung Chan
Associate Editors: Walt Polka and Peter Litchka
Assistant Editor: Holly Catalfamo
December 2017

ABOUT THE AUTHORS

Philip Alsup is an adjunct professor and doctoral research consultant with the Liberty University Graduate School of Education, an adjunct professor with the Bob Jones University Graduate School of Education, and a K-12 school administrator in private education in Michigan. He is a published author with the Journal of Research in Christian Education.

Glenda L. Black is an Associate Professor at Nipissing University, Schulich School of Education, where she teaches in the consecutive initial teacher preparation and graduate studies programs. Her research interests include international teaching practicums, indigenous education, community service-learning, and community engagement.

Angel Ford is a senior research associate with the Graduate School of Education and Human Development (GSEHD) at the George Washington University, currently working on an international partnership program implementing a new PhD program for Taibah University in Saudi Arabia. Previously she was a research associate with Education Facilities Clearinghouse, a United States Department of Education funded grant project administered through GSEHD at GWU. Prior to her work in higher education, she held administrative positions in a private school.

Rosina Mete is currently a Doctoral Candidate completing her Ph.D. within the Leadership and Policy program at Niagara University. She has authored publications in the fields of educational leadership, educational technology and health sciences. Rosina has worked in research within academic, mental health and health care settings. She currently works in Ontario (Canada) as a registered psychotherapist in community health care settings with a general adult population as well as a chronically ill population.

Caitlin Riegel is currently a Doctoral Candidate completing her Ph.D. in Leadership and Policy program at Niagara University. She has authored publications in the fields of educational technology, educational planning and teacher preparation. She currently works as an Adjunct Professor at Niagara University teaching undergraduate and graduate education courses in the College of Education and undergraduate mathematics courses in College of Arts & Sciences.

Canute Thompson is a Leadership Coach and Certified Management Consultant. He is Head of the Caribbean Centre for Educational Planning and Lecturer in the School of Education and Department of Government at the Mona Campus of the University of the West Indies. Dr. Thompson holds a Ph.D. degree in Educational Administration and Leadership and postgraduate and professional training in Management.

Maria Cantalini-Williams is a full professor at Nipissing University, Schulich School of Education, where she teaches in the concurrent education program and graduate studies programs. Her research interests include collaborative inquiry, innovation in education, international placements and work-integrated learning.

EXPLORING ELEMENTS OF COMMUNITY NETWORKS: FAMILY AND COMMUNITY ENGAGEMENT STRATEGY PROJECT AS AN INNOVATIVE MULTI-AGENCY PARTNERSHIP

GLENDA L. BLACK
Nipissing University

MARIA CANTALINI-WILLIAMS
Nipissing University

ABSTRACT

Based on the success of the Welcome to Kindergarten™ initiative, The Learning Partnership (TLP), a national advocacy organization for public education, initiated a pilot project called Family and Community Engagement Strategy (FACES), in the three Ontario communities of Cornwall, Durham and Sudbury. The overall goal of the FACES Project, funded by the Ontario Trillium Foundation, was to develop a coordinated community-based model and extend and enrich the Welcome to Kindergarten™, a program to help prepare children for school success. As part of the agreement, TLP was to provide evidence of progress made toward the objective of the grant: to increase and expand opportunities for all children to be ready for school. An evaluation component was included in the project to measure the results and impact on each community. The FACES Project is an example of a community network, as it involves a process of building partnerships among schools and agencies for the benefit of children and their families. A qualitative case-study design was used for the research. Themes that emanated from an analysis of the data across the three sites were: the nature of FACES as a community network, champions as leaders, establishing and sustaining FACES networks, challenging conditions, assessment of the impact, and innovative features of FACES networks.

BACKGROUND

The *Welcome to Kindergarten*™ program is a strategy that brings together parents/caregivers, children, and educators for orientation sessions at their local school to prepare children for their first day in the classroom (The Learning Partnership, 2017). Educators receive training and resources from *The Learning Partnership* (TLP) to host WTK sessions. In the year before the child starts school, parents/caregivers and children are invited to attend one or more WTK sessions. At these sessions, they are provided with a WTK bag that is full with early learning literacy and math resources that they can use at home to help prepare their child for school and learning (The Learning Partnership, 2017). During the WTK sessions, parents/caregivers and children have an opportunity use the resources and to meet the kindergarten educators, the principal, and community support agencies.

The FACES initiative was to foster more responsive and active relationships among community partners. As a development project, FACES involved the three communities and TLP in a process of knowledge creation (Bruce & Flynn, 2013; Hannay, Wideman, & Seller, 2010). Each of the three communities co-created a version of FACES, combining community and educational resources to form multi-agency, integrated services within their context to achieve goals and deliverables as identified in the funding agreement with the *Ontario Trillium Foundation*.

The Learning Partnership hired three coordinators to lead the FACES project in each respective community of Cornwall, Durham, and Sudbury. A steering committee was established

with members from various publicly funded and private organizations related to early learning at each of the three FACES sites. Although the dynamics and composition of each community were different, there were similarities in purpose and outcomes. Partners in the FACES projects included: project coordinators, steering committee co-chairs and members, school administrators, teachers, early childhood educators, representatives of various community agencies and parents of children registered in kindergarten.

A research team of five Nipissing University faculty members was successful in their application proposal to evaluate the impact of the FACES pilot project. The evaluation process collected data about the perceptions of coordinators, steering committees, community partners, principals, educators, and parents and became a source of ongoing information and feedback for TLP and each community. In the present article, the organic development of the FACES project across sites is described as a model of an educational community network, formed for a purpose, yet fostering creativity and innovation to reap benefits for present and future generations of families and children.

LITERATURE IN CONTEXT

The FACES Project is an example of a community network, as it involves a process of building partnerships among schools and agencies for the benefit of children and their families. Characteristics of successful partnership networks are continually reflected throughout the literature and certain elements appear to be necessary for establishing and sustaining multi-agency partnerships. Such characteristics include: networks of trust-based relationships; shared knowledge and experience; willingness to persist and work together on identified problems; and learning with and from a variety of partners. In these ways, multi-agency partnerships collaborate to structure and authentically share different responsibilities related to children's early learning.

Block (2009) describes networks and social fabric as being developed through a process of possibility-focused conversations involving members of the community to develop vision, purpose, and action. The literature reviewed in this article contextualizes FACES as an innovative network resulting from research to create policy and practice in the fields of early learning, school transitions and community partnerships. Three main themes emanate from the literature elucidating essential elements of networks: 1) the role of trust-based relationships and collaboration; 2) the role of shared leadership and vision in community partnerships and; 3) the ongoing resolution of challenges and opportunities. The literature review thus explores these elements and various approaches to building networks involving collaboration and shared leadership through school-community and multi-agency partnerships.

Trust-Based Relationships and Collaboration in Multi-Agency Networks

Community building happens at the rate of relational trust. An impressive body of research supports relational trust as a characteristic to successful change (Adams & Forsyth, 2013; Barkley, 2008; Bryk & Schneider, 2003; Edwards-Groves, Grootenboer, Ronnerman, 2016; Kemmis, Wilkinson, Edwards-Groves, Hardy, Grootenboer, & Bristol, 2014; Tschannen-Moran, 2014; Turnbull, Turnbull, Erwin, Soodak, & Shogren, 2015). Barkley (2008) explores the work of Bryk and Schneider (2003) identifying four key elements essential to building effective collaborative relationships and the successful development of multi-agency partnerships: respect, competence, personal regard, and integrity. Barkley supports the notion that collaborative community partnerships can benefit over time from sharing and considering self-assessment processes. Furthermore, Barkley references the work of Palmer (1998) who recommended members of networks actively listen to the

stories of fellow members to build trust as a foundation. Blankstein (2011) in his book, *The Answer is in the Room*, succinctly captures the significance of trust, "As trust is built, people are focused on working together to solve a problem they have collectively identified important. This, too, helps foster relationships and trust." (p. 90)

The importance of creating trust-based, collaborative relationships among independent partners, along with developing common goals and undertaking collective action, were fundamental to the success of the three FACES projects. Bryk and Schneider (2003) describe relational trust, as "an interrelated set of mutual dependencies embedded within the social exchanges in any school community" (p. 41). The development of relational trust is regarded as a priority at all levels of any community partnership or project because it is such a fundamental basis for conversation that moves participants beyond their "silos" and into a space where multi-agency collaboration is not only possible but can thrive (Block, 2009). Relational trust has also been described as the, "connective tissue that binds individuals together to advance education and welfare of students" (Bryk & Schneider, 2002, p. 45) and this notion emerged consistently in data collected for the study of the FACES Project as an example of a community network.

Shared Leadership and Vision in Community Partnerships

Mangione and Speth, (1998) and Malsch, Green and Kothari, (2011) identified the fundamental elements as important to home and school community partnerships for supporting the transitions of young children to school: families as partners, shared leadership, comprehensive and responsive services, culture and home language, communication, knowledge and skill development, appropriate care and education, and evaluation of partnership success. These findings also underscore the importance of a shared vision held among all the practitioners working in home, school, and community partnerships. An emphasis, particularly in the UK, on "multi-agency partnerships" are increasingly seen as contributing to, and supporting the efficacy of, combined community and educational resources in the interests of early learning (Chemenais, 2009).

Similarly, in a synthesis of two studies with schools identified as inclusive, knowledge development sites researchers identified common themes related to creating optimal family-community-school partnerships: "invest in creating positive inviting, and inclusive school culture; provide strong administrative leadership driven by a clear vision of inclusion; exhibit attributes of trusting partnerships (i.e., commitment, communication, collaboration, and respect); and provide opportunities for reciprocal partnership and involvement" (Haines, Gross, Blue-Banning, Francis, & Turnbull, 2015, p. 237). The research shows that multi-agency partnerships will need skillfully designed tools to assist them in their work as they develop shared vision, common goals, and undertake collective action for a continuum of care (Yau, 2009).

Ongoing Challenges and Opportunities

Recurring themes in the related literature include the many and varied complex challenges for multi-agency partnerships. The nature of these challenges includes: personnel issues, time management, role clarification, parental attitudes, and communication between partners. It appears that parents and educators desire collaborative relationships (Christenson, 2003) but, with all the best intentions to work successfully together, creating and sustaining these relationships is not easily accomplished. Furthermore, while the addition of community partners to the network may offer support, this often contributes further complexity to the entity. As multi-agency partnership projects develop, participants need to see ongoing evidence that their efforts are resulting in progress toward the goals to which they are committed. Glickman, Gordon, and Ross-Gorden (2009) report there

is little motivation for collective action toward agreed-upon goals unless participants believe their efforts will bring success. Further, Kaehne (2015) underscores the need for all partners to engage fully at the early stages of the partnership to ensure the partners have protocols in place to facilitate the changes that are required with the newly established partnerships.

Barclay and Boone (1995) describe partnering as a responsibility of all school personnel – across and beyond school roles. Of particular relevance to FACES are the many ways they suggest to build partnerships with those "hard-to-reach" families. Warnemuende (2008) highlights the critical importance of developing mutual trust and respect among children with disabilities, their parents, and the principal – as well as the need for accurate knowledge about the students at the school level. Christenson (2003) provides an intricate representation of potential structural and psychological barriers for families and educators in building family-school relationships. While status-oriented family issues (e.g., Social Economic Status, parental education, and number of adults in the home) are considered important, Christenson contends the psychological aspects of understanding complexities inherent in families' situations must be given priority. Pushor (2007) describes the experience of working in a challenging neighborhood school where issues of transiency, student behavior, and the need for culturally reflective programming disrupted the school staff's traditional perceptions of families and prompted the creation of an entirely new direction. The present study of the FACES Project, through the lens of trust based relations, shared leadership responsibilities/ vision, and challenges and opportunities for building successful multi-agency partnerships provides a current example of a complex, yet sustainable community network, striving to meet the needs of today's families in facilitating smooth transitions and successful entry to school.

METHODOLOGY

A qualitative case-study design was used for the research (Coles, 1993; Merriam, 2009; Yin, 2009). The approach was ethnographic, developing a picture of an emerging culture in each case and across cases over two years. Each of the three communities, Cornwall, Durham, and Sudbury, were explored both individually and collectively. The number of participants varied among communities and between data collection cycles. Research participants in each of the three communities included project coordinators, steering committee co-chairs and members, community agency representatives, principals, vice principals, teachers, early childhood educators, and parents who were involved in FACES activities.

The research questions pertaining to the present study were:

- What are the defining features of the FACES network?
- What is the perceived impact of the FACES network on stakeholders?
- What are the challenging, innovative and sustainable features of the FACES Project as a model of community network?
- How can the knowledge and experience gained from the three community networks be mobilized to inform policy and practice?

Data were collected and analyzed in two annual cycles by the research team. Informal feedback and preliminary findings were provided to the communities after each cycle. Two sources of data were utilized: 1) documentation and resources provided by *The Learning Partnership* and each of the three communities and 2) participants' perceptions through individual (Seidman, 2006, 2013; Kvale, 1996) and focus group interviews (Seidman, 2006, 2013). The interviews followed a semi-structured approach (Jones, 1985; Fontana & Frey, 2000), with a set of guiding questions differing slightly for each group. There were a total of 93 individual and group interview sessions,

each approximately 45-60 minutes in length, conducted by members of the research team. Across the three communities, 61 focus groups were held with three to six participants in each group in addition to the 32 individual interviews. At the conclusion of each individual and focus group interview, participants were invited to contact the researchers by telephone or e-mail with further comments. All individual and focus group interviews were audio recorded and transcribed for analysis.

Since the FACES evaluation was exploratory and inductive (Lincoln & Guba, 1985) and in accordance with the concept of emerging design (Glaser, 1992), the methods and questions used in the evaluation varied and evolved due to differences in the three communities and because development of the FACES projects was ongoing. Methods of data analysis included the three streams of activity identified by Miles and Huberman (1994): data reduction (review data, develop codes, code data to summarize, sort, and organize); data display (organize and compress data into matrix); and conclusion drawing/verification (make meaning of the data by noting patterns, interpretations, triangulation of sources). Using interview transcripts and documentation from the various sites and sources, constant comparative analysis of data (Glaser & Strauss, 1967; Handsfield, 2006) was conducted to derive categories and themes in the data. Subsequently, conclusions were drawn from results in various data displays, and verification involved triangulation of data from the multiple sources across all three sites.

FINDINGS AND RESULTING THEMES

The data collected included discussions with TLP, artifacts, and documents provided by each site, and volumes of transcriptions resulting from the numerous focus groups and interviews conducted with various participants across the three sites. The five faculty members reviewed the data, developed summaries, organized the data and drew conclusions both within and across sites. Each community was examined as a separate case study, with across case comparisons also made in the analysis process. The results are presented and discussed in relation to each of the four research questions and resulting themes.

Research Question 1: Defining Features of FACES

The nature of the FACES project as a community network.

Each of the three communities of Sudbury, Durham, and Cornwall approached the implementation of FACES differently, yet there were similar features across sites. All three communities had a project coordinator contracted by TLP and a corresponding steering committee comprised of community stakeholders. The project coordinator of each site had similar, yet varying backgrounds and each steering committee also had slightly different compositions.

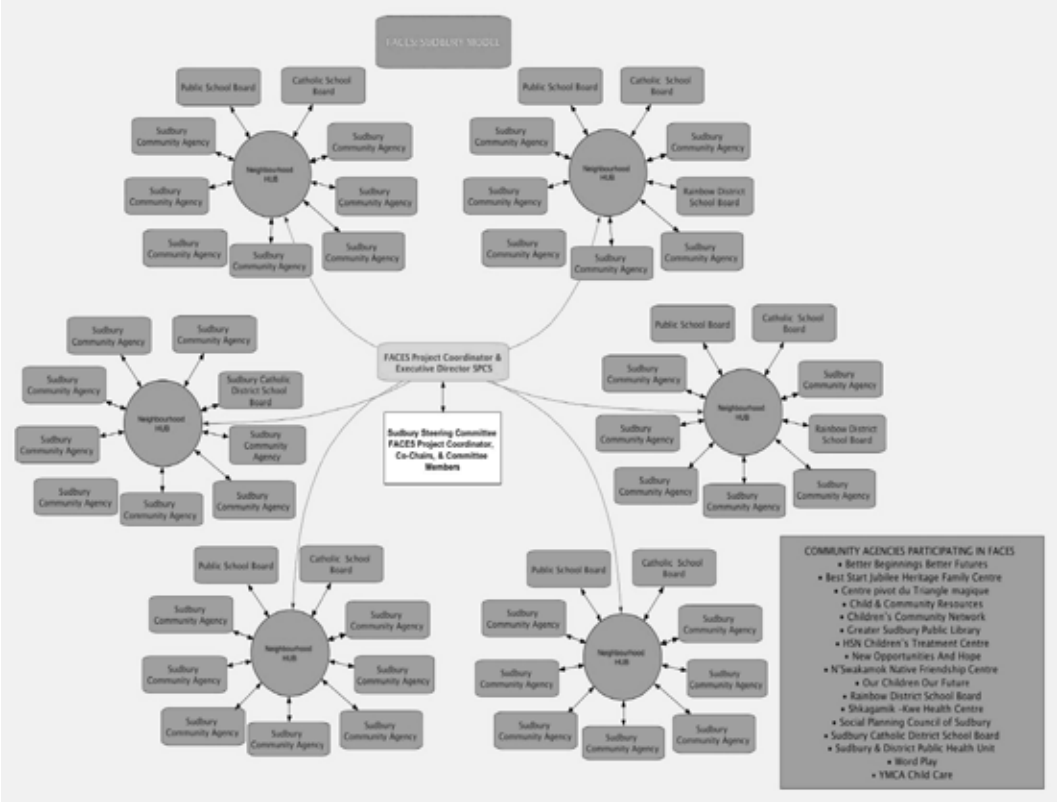
The city of Sudbury is regionally organized into several neighborhoods and this structure was used to frame the FACES Project. The executive director of the Social Planning Council was contracted as project coordinator and took a leading role in shaping the FACES project. The coordinator was supported by a steering committee comprised of representatives of the partnering community agencies including the English public and Catholic district school boards. The committee's two co-chairs were representative of the public board and the Sudbury and District Public Health. With an emphasis on collaborative problem solving, steering committee members worked with agencies in six hubs, each of which included a number of schools. The purposes and planned organization of FACES in Sudbury was quite different to the more school-based localized sessions organized in the other two communities. Sessions in Sudbury resembled community-wide orientation and training sessions compared to the local WTK/FACES sessions in Durham and

Cornwall that included parents and children. The FACES sessions held in Sudbury were organized to include representatives from numerous agencies of each neighborhood, working in partnership with school personnel (e.g., principals and teachers).

In Durham Region, the FACES project was a partnership between the Durham District School Board and various community agencies. There were 28 schools representing the northern and southern regions piloting the FACES initiative. The Durham District School Board and community agencies had historically been involved in a number of related initiatives and programs. The partnership between the school board and the early childhood education partners were well established in the region prior to the introduction of the FACES project. The organizational structure of FACES in Durham was very complex as the centre of the project was a steering committee, representative of the Durham District School Board and community services personnel. The FACES coordinator in Durham was a retired school principal with a long history as a member of a number of early learning/ childcare initiatives in Durham. The steering committee co-chairs together represented both the school board and community agency perspectives. The rest of the steering committee consisted of highly engaged and diverse group of individuals representing staff from both the school board and community agencies with a purposeful mandate to integrate the school board and community representatives. The steering committee, supported by the FACES coordinator, provided balanced and informed direction and guidance for the implementation of FACES activities in schools and in the community at large.

The Cornwall FACES Project was similar to Durham, yet represented both the local Catholic and Public School Boards and community agencies on the steering committee. The project coordinator was an active and well-respected community leader with experience in the early childhood field. Cornwall, like Durham, held school based FACES sessions for parents and children at thirteen different schools. In all three sites, the nature of the FACES project entailed community partnerships for a common purpose, organically developed, to meet the needs of young children and their families. Figures 1, 2 and 3 provide graphic depictions of the complexity of each network with interesting features such as committees, subcommittees, and hubs working together.

Figure 1: The Structure and Organization of the FACES Project Network in Sudbury



Champions as leaders of FACES networks.

Although the FACES initiative brought the community partners together, the network representatives at each site struggled with a process to achieve the FACES goals and required leaders with a vision to operationalize their goals. In each community terms of reference were created by the project coordinator and steering committee outlining the committee's mandate, reporting structure, membership, decision-making process, and objectives. These were periodically reviewed during the project to ensure that the steering committee was staying on task. One co-chair commented,

> One of the foundations that we spent a lot of time on right at the beginning was our terms of reference and narrowing down the wording to make sure, as much as possible, that it reflected the philosophies of each group [community agency] represented.

There was a clear focus in all three communities on responding to the needs of families with concerns raised around finding innovative ways to enable all families to engage with services and programs enhancing the present WTK initiative in their community. In Sudbury, the project coordinator and steering committee members consistently reflected the emphasis on attracting families who did not attend the planned events, and removing the barriers preventing those families from participating. The FACES project coordinator and steering committee identified a shared goal and were propelled into action to pursue strong community partnerships with marginalized families

and not on getting the families that were already engaged in doing more; rather, their goal was to reach those families who were not attending activities offered at the community Hubs.

In Durham region, the FACES coordinator and steering committee co-chairs were the visible champions of the initiative. The co-chairs, representing the education and community sectors, put much effort into building a solid foundation that would create a cohesive, open, and reflective atmosphere. Committee meetings were organized in a round robin, circular formation with members intermixed to enhance the integration of ideas and representatives from the schools and the community. New sub-committees were formed including the Training/Orientation Sub-Committee and the Best Practice Resource Sub-Committee; each of these sub-committees had specific responsibilities for ensuring the successful implementation of FACES.

In Cornwall, the leadership of the FACES project was more centralized on a school board perspective since the two co-chairs were representatives from the Catholic and Public School Board. The steering committee included seven members from the school boards, again stressing the important role of educators for the FACES project. At an initial orientation session, one participant explained the project, "a really true, beginning collaboration; having the teachers and the community agencies talking and planning together, a really great first step." The project coordinator was a respected long-time member of the community who had no previous employment experience with the community partners. The steering committee focus was to support the development and implementation of FACES sessions with commitment from the community agencies and school boards. This was accomplished to a large extent through the process of dialogue, decision-making, and collective action involved in committee work – work that enhanced interpersonal relationships among school board and agency personnel, first within the steering committee and then the localities. One member explained, "The decision-making process takes a bit more time. But at the same time, . . .without universal buy-in to the ongoing decision-making, the danger is that agencies will begin to fall away."

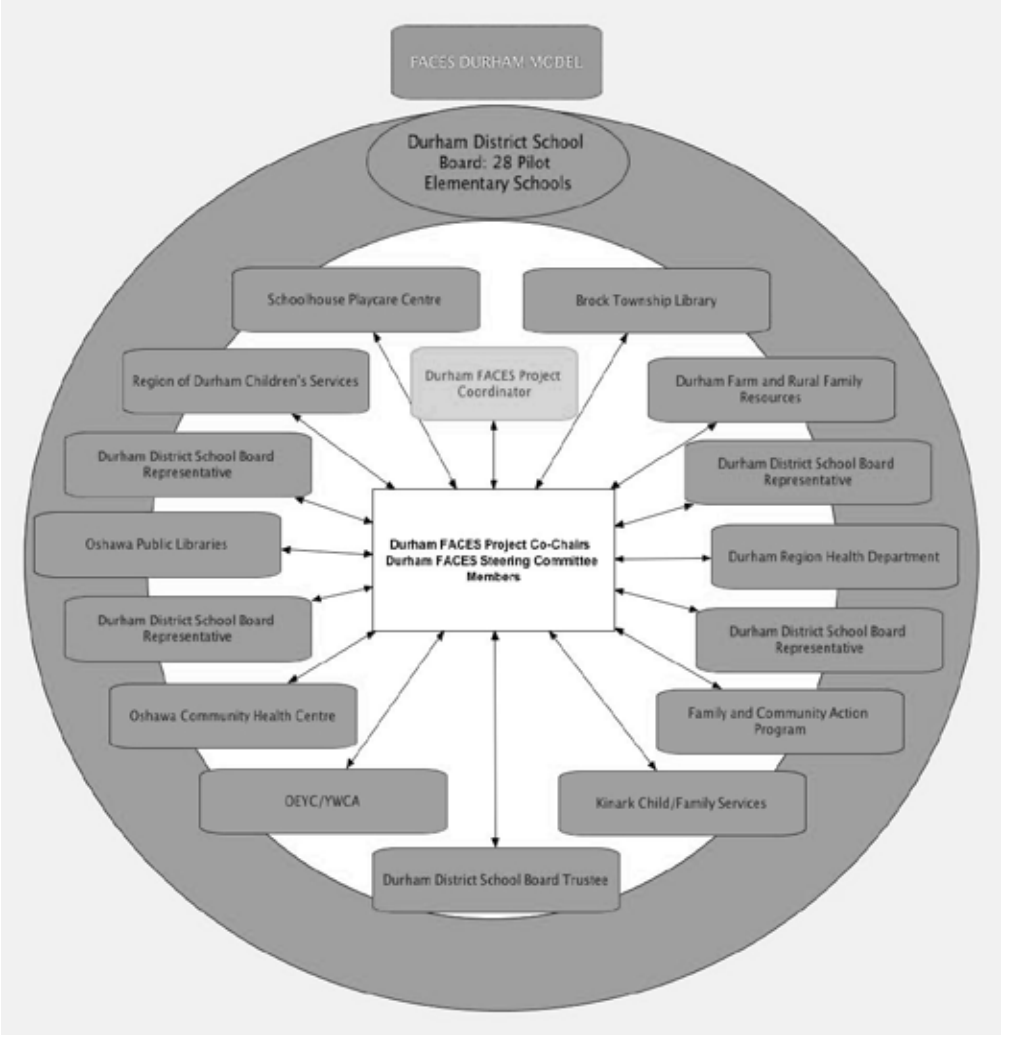
At all three sites, the leadership provided by the FACES coordinators and steering committee members, were pivotal to the success of the project. The community networks, formed at each site were characterized as distributive leadership, focused on shared decision-making, and consensus-building for collective action. Even though some FACES sites were more community-based rather than school board-based, all were focused on reaching out to families for the betterment of young children.

Innovative and sustainable features of the FACES networks.

All three sites were innovative in their approach to the implementation of the FACES Project goals. *The Learning Partnership* provided some guidance, but allowed each site to meet its unique needs with their own creative problem-solving endeavors. The sites strived to develop networks, which included features ensuring the longevity and sustainability of the initiative.

The Sudbury network was innovative in their approach to achieve FACES goals in that the steering committee, under the leadership of the chair, used FACES as the stimulus to further their shared concerns of working with marginalized families. The structure of FACES was innovative – the schools were considered as community partners, not the center of the network. Central to the FACES network was the dual role for the Executive Director of the Social Planning Council, who was also FACES project coordinator, and turned out to be particularly beneficial in promoting a community partnerships approach to FACES/WTK in Sudbury. The organization of local neighborhood hubs further enabled FACES in Sudbury to be tailored to meet both local community needs and the goals for FACES identified by TLP.

Figure 2: The Structure and Organization of the FACES Project Network in Durham



The innovative features of the Durham and Cornwall FACES initiative, and the sessions offered for parents and young children, were mostly evident through the collaboration of school board and community service agencies. The purposeful and collegial efforts of the FACES coordinator, steering committee members and the pilot schools were innovative in that this type of collaboration had not yet been attempted in previous strategies to ease school transitions. Another innovative strategy in Durham was to use a range of approaches to engage parents including phone invitations, staggered sessions with resources, community-based sessions at sites such as libraries, and ongoing cycles of review and reflection. The main innovation developed by the Cornwall group was the Family Fun Kit concept to entice and support parents in their efforts to prepare children for school entry. These kits were creative and practical applications of the FACES goals promoting

engagement and learning in families across the schools' catchment area. Overall, the three sites were innovative in interpreting the goals of the FACES initiative and meeting the needs of each distinct community. Each FACES steering committee developed unique terms of reference and used strategies appropriate for their stakeholder groups.

Figure 3: The Structure and Organization of the FACES Project Network in Cornwall

Research Question 2: Perceived Impact of FACES

Assessing the impact of the FACES networks.

The effectiveness and impact of the FACES initiatives in each community were assessed through the self-reporting by participants who included educators, community partners, and parents and the attendance and evaluations of FACES sessions, which provided feedback on the intended outcomes. Overall, there was a strong sense that the FACES project activities were effective in creating new partnerships, engaging parents, and increasing awareness of strategies to facilitate school transitions.

Factors for evaluating Sudbury's network include the effective collaboration among community partners, increased opportunities for professional learning, inclusion of community partners not previously engaged, and an increase in the number of targeted participants at planned events. Further, the Sudbury network used assessment criteria to identify variables and appropriate criteria for measuring the impact of their work in the community. For example, the steering committee collected feedback after each session to inform the committee's next steps. Feedback gathered from participants during the *Marginalized Families* workshop in Sudbury, further informed the steering committee's decision to host the *Getting Everybody In* workshop. Community partners

who attended this one-day event participated in activities clearly focused on further developing their cultural sensitivity to marginalized families' issues. Participants reported heightened awareness of the cultural, societal, and service provider barriers imposed on the marginalized population, and they also shared experiences of exclusion, early school experiences, and racism. As reflected in workshop evaluations, the participants believed the session was a positive experience and fulfilled the goal of the session, "to become more effective supporters of parents and families of all backgrounds."

Data collected in five Durham region schools indicated FACES had a significant positive impact for all groups of participants. Parents were mostly enthusiastic about the sessions. One parent exclaimed, "My daughter absolutely loved it." Parents noticed the children were encouraged to try out new activities at the sessions and they repeated these activities at home. One parent stated, "It encouraged them to want to do some of these things and practice them at home." However, some parents reported that their children were a little overwhelmed if a WTK/FACES session included too many people and activities. A few were concerned that the FACES sessions may not provide an accurate picture of how a real classroom would operate in September. In relation to community agencies, parents were thankful that they had the opportunity to meet community agency representatives and educators.

In the second year, parents noted a variety of FACES sessions that focused directly on curriculum areas. Some wondered if such sessions might be provided earlier in the school year. Others felt strongly that sessions should focus directly on the learning expectations of the kindergarten program. Generally, parents felt that the opportunity to attend consecutive sessions (rather than a single WTK session) with involvement by educators and community agency representatives assisted their children to transition more smoothly to school. A strong factor contributing to the perceived success of the WTK/FACES sessions by parents was the opportunity to meet the future teacher and to become more aware of classroom routines. Teachers said that the hands-on activities were beneficial for parents. As reflected in the words of a teacher, "It was very good for parents to see that learning to read and write doesn't mean a paper and pencil." Through FACES, community agency representatives strongly reported becoming more familiar with school personnel, financing, and operations. One said, "First there was reluctance from front-line workers but, after the sessions were completed, they really enjoyed the experience."

In Cornwall, the impact of FACES was evident across all sectors, originating from the commitment of the steering committee members. Steering committee members reported, "support for FACES within the steering committee, the participating school boards and the community agencies is solidly in place" and that a strong commitment existed to "move the project forward." As one steering committee member declared, "We're all volunteering our time so I think we're pretty committed to why we're here. And when we're here, we're pretty committed to getting the things done we need to get done." Another major accomplishment in Cornwall was the development, production and distribution of five different Family Fun Kits to give to parents during the FACES sessions. Parents said that their children appreciated the learning resources they received during local FACES sessions. One said, "Yes, they got a little bag of stuff and they were very proud of the little bag they got to bring home. They were very excited." Another said, "She showed her big sister all the things she got." Many community partners spoke passionately about the trusting, professional relationships that had developed or enhanced during the FACES project among the community agency representatives and school staff. One participant explained, "No other hands-on project but FACES has ever built such a bridge between the schools and the agencies in our community." Generally, the parents, administrators, teachers/educators and community partners across the three sites were very positive about the impact of the FACES project and sessions and

spoke highly of the value of the FACES activities in promoting school readiness, collaboration and shared responsibility for successful school transitions for young children and families.

Research Question 3: Challenging, Innovative, and Sustainable Features of FACES as a Model of Community Network

Challenges of establishing and sustaining FACES networks.

The task of establishing and creating the FACES Project in each community was monumental given the other priorities and responsibilities of the members of each stakeholder group. In addition, there were many other similar early childhood initiatives already underway in the communities of each site, therefore it was challenging to introduce the new FACES project as yet another early learning activity. For example, in Sudbury projects were already underway to engage families in early learning at the Hubs included an eight-week *School Readiness Program* and *Bags for Babies*. Under the leadership of the project coordinator, it was determined that the work of the Sudbury FACES steering committee should be to focus on engaging marginalized families. The steering committee developed The *Family Engagement Framework,* which outlined their vision and guiding principles. The vision was presented as follows:

> Working at the neighborhood level, Sudbury FACES will create plans that encourage all families to make early and important connections to the educational community. The vehicles to this vision include WTK in the schools and all the supportive opportunities provided by the Best Start Hubs and the wide variety of connected community partners.

The Sudbury steering committee used this framework to organize an event attended by over 100 community representatives titled: *Getting Everybody In*: *Create Local, Neighborhood Based Plans for Inclusion Results for Community Partners.* The purpose of the planning workshop was to bring together community agencies in neighborhood specific engagement strategies. Using existing locations of the *Best Start Hubs*, participants in the session were organized into six neighborhood groups/hubs. Each group was issued the challenge of creating a plan to meet the FACES vision that would also have relevance for their local neighborhood Hub. The neighborhood groups identified policy implications or issues that might support or prevent engaging marginalized families. After identifying the issues in their respective neighborhoods, the groups gathered information to create a plan, and generated lists of specific actions to carry out their plans. The Sudbury FACES coordinator and steering committee maintained their momentum to reach out to marginalized families with a focused collegial approach.

The implementation of the FACES project in Durham was a prime concern of all involved. In year one of the FACES project, the project coordinator and co-chairs worked collaboratively with the steering committee members and partner schools and agencies to host two orientation sessions for representatives intended to explain the focus and intended outcomes of the FACES initiative. The use of cooperative planning time and templates for the school-based sessions was critical to the successful implementation of the family engagement activities. There were at least two sessions planned for parents and their children in each of the 28 participating schools. Sessions addressed such topics as literacy, numeracy, healthy eating, and school transitions. These sessions were usually co-planned and co-delivered by teachers, educators, and community partners. Attendance was good for the first session but waned in session two across most schools. In the second year of implementation, the steering committee started to create a sustainability plan for FACES, which described structural considerations such as organization, program resources and training, funding, program support, and evaluation, and reporting methods.

Further, the Durham project coordinator and the co-chairs developed a draft overview of potential FACES success indicators. The steering committee reviewed the draft recommendations and provided feedback that was used to redraft the indicators of success for future use. An example of a change in approach from year one to year two - the FACES orientation/training day was revised and the sessions were held in smaller, more geographically-diverse locations. Using two locations allowed for smaller groupings of people to interact and reduced the driving time for participants, thereby increasing attendance. It was noted that school teams and community agency partners were more comfortable with each other in year two, which contributed to a more concise and streamlined session that conveyed specific information and direction on the components, expectations, and resources of the FACES program. Schools also continued to tailor their local FACES sessions to best meet the needs of their communities. This local autonomy was deemed important to the success of the program. Sustainability was also ensured by attention to ongoing surveys, feedback loops and also to presentations made by the FACES Evaluation Team.

In Cornwall, the establishment of the FACES project was enthusiastically undertaken by the project coordinator and steering committee members. The first meeting was held at the school board office and was well attended by community stakeholders who hosted carousel information booths for greater awareness of all members including the school board personnel. The priorities of the steering committee in year one were to build commitment for FACES among the community agencies and school boards and to get the local FACES meetings started as quickly as possible (a minimum of two FACES sessions annually per participating school).

Priorities emphasized in the second year were to develop ways to extend and strengthen parent engagement in addition to FACES meetings and develop plans to sustain FACES once funding from TLP ended and the project coordinator was no longer in place. The Cornwall FACES coordinator and steering committee worked diligently to meet at least once a month in the first year. They reviewed community data related to young children and families and based on their understanding of community needs, developed terms of reference and a work plan. In Cornwall, two FACES sessions were offered at each school on a number of early learning-related topics. These sessions were collaboratively planned and presented by school and community representatives. This collaborative planning was considered a strong point of the project and a reason for success.

The establishment and sustainability of the FACES projects at the three sites were based on a strong foundation of involvement in early learning initiatives, a solid understanding of the collaborative process, and continual cycles of review and reflection. The role of *The Learning Partnership* was significant in facilitating meetings of the three site coordinators, with input from the FACES Evaluation Team, which supported the sustainability of the projects at each location. Regular reporting structures, agendas, minutes of meetings, and interim reports all contributed to the shared information and provided momentum to the project sites.

Challenging conditions and innovative features of the FACES networks.

The FACES networks in each community had both positive enabling features and ongoing challenging conditions. The enablers at each site included strong local leadership and a collaborative a focus on families' needs with a tolerance for ambiguity. The challenges common across sites were reported as the need for greater time, resources, and clarity.

Steering-committee members experienced various levels of overwhelm when trying to balance all the competing demands on their time – both as professionals and members of the steering committee – and a recurring sense of discouragement, at times, that no matter how hard they tried it was often just not possible to reach the most needy families. Complex challenges encountered

in *balancing* time commitments were shared – for example, attempts to effectively balance their full-time responsibilities (as employees) and their voluntary contributions as part of their role in the community partnerships aspect of the steering committee, which were often seen as equally relevant to the interactions with families during their full-time jobs. There was also frustration around the frequent turnover of staff within local agencies and the inevitable impact this had on stability in terms of consistency and support for new initiatives. As one steering committee member emphasized, "It requires us continually to repeat and adapt training and double back to re-develop common understandings and agreement."

Another challenge noted by interviewed participants was the need for more resources. In the words of one participant, "It's easy to say, 'Well, we could do this and we could do that.' Of course we could, but there is a need to operate within the resources that are available." Embedding FACES within the normal operation of the partner organizations was an innovation deemed to increase the longer-term ability of FACES to compete for resources with other projects in the schools and community. One participant asserted:

> Right now FACES is new and bright and shiny. The first years of a project are usually like that. But in the future, we're going to need to sustain engagement and you have to fit well into the big puzzle of what the community is interested in and focused upon.

As a further challenge, the need for clarity was experienced in the development of the vision of the project for each community. For example, in Sudbury, the steering committee evolved with a clear focus on engaging marginalized families and creative solutions were developed to address ongoing challenges and to nurture sustained action. This work was further informed and enhanced by the local neighborhood hubs, as led by representatives of the Best Start Network. The process of achieving the success was not immediate, as reflected by a steering-committee member, "We had to try to figure out what being part of this committee meant. It's been kind of a muddy road but once we figured out where we were going things got a lot clearer." In all three communities, the processes of talking, sharing, and informing the conversation from different perspectives around the table and an openness to innovation moved the committee toward consensus and a clear sense of direction.

Another challenge related to clarity, discussed extensively, was the meaning of the word engagement. It became important for educators and community agency staff to continue to learn about why parents are engaged or not engaged. One FACES participant put it this way, "All parents want the best for their children. We need to know about what is blocking parents individually and systemically from active engagement in their children's learning. We need to remove those blocks and substitute effective support." Related to the need for clarity, was the overall perception held by many participants that the term FACES was not well understood by parents and partners. Many schools continued to use the term *Welcome to Kindergarten*™ in reference to the FACES sessions and instead often utilized WTK/FACES sessions for general communications. The need to clarify the concept and language related to the initiative was pervasive in the participant interviews and focus groups.

Research Question 4: Knowledge and Experience Gained from the Three Community Networks

Lessons learned: Networks as catalysts for change and innovation.

Across the three pilot project sites for FACES, it is evident that the networks created have

been catalysts for change and innovation in the field of early childhood and school transitions. FACES in Sudbury has continued to mobilize community partnerships, guided by the project coordinator and steering committee and build on the energy and enthusiasm with an emphasis on a project seen as highly relevant to the community (i.e., the increased engagement of marginalized families).

The FACES Network in Durham has been an energetic undertaking involving centralized guidance and localized implementation to meet the needs of young children and their families. The changes which emanated from this network are a greater sense of collaboration among school and community partners, an increased awareness of effective strategies to engage families and the development of planning templates and accompanying resources in a binder/handbook collating all the Best Practice materials related to FACES initiatives for common sharing and understanding.

In Cornwall, many changes were noted by participants due to the FACES project such as a significant positive impact on building closer relationships among educators and the community agencies. One participant affirmed,

> When we had that day at our school board and all of the Public and Catholic Kindergarten teachers were there and most of our principals. It was the first time I remember when the two boards got together on a project like that in one room. It was really neat – ground breaking.

Educators reported that greater mutual understanding and appreciation has developed between educators and the community agencies. As one person put it, "Teachers are more relaxed with their community partners. Sometimes community partners just drop in during the day. This is real progress." Another change was the opportunity to review Early Development Inventory Data (EDI). One educator said, "Last year was probably the first time that most kindergarten teachers in our board anyway, really were able to sit down and see the results."

In summary, many changes occurred due to the FACES project and the formation of community networks. Most notably, service agency staff and school staff became better acquainted and worked together to engage families in their children's learning. The teachers from across schools and local boards met, sometimes for the first time with their counterparts to review early learning data and to plan community initiatives. The stakeholders in early childhood learned more about each other's roles and collaboratively reached out to families, utilizing a unified approach. Children entering school were invited with their families to repeated sessions offered by community partners and teachers. This was an innovative change to the traditional one-time orientation session previously offered by some schools. The FACES networks will hopefully be sustained over time with increased resources and support in the form of release time for personnel from all the community agencies, including schools to engage and collaborate, physical space to host orientation sessions and meetings to coordinate events, and early years literacy and math materials for parents to use outside the classroom to support children's transition to the classroom. An innovative mindset and sustained resources were deemed to be important for future success.

Networks informing future policy and practice.

The final research question of "How can the knowledge and experience gained from the three communities be mobilized to inform policy and practice?" can be answered with a set of recommendations for policy changes derived from the findings of the present study. Knowledge mobilization strategies are essential to capitalize on and share new understandings gained from these three initial FACES projects. As Johnston and Kirschner (1996) found, studying individual examples of community partnerships is a means of identifying more general principles governing success. The evaluation of the FACES projects has demonstrated that promoting increased parent

engagement in children's early learning is a complex project that will require sustained efforts and resources over a number of years. Three key understandings resulted from the development of the FACES networks:

1. Members of a multi-agency network need to begin by focusing on the development of a shared vision, terms of reference, a collaborative inquiry stance, and a consensus-based decision-making process. Clear project parameters and defined success criteria are critical to collaborative work in multi-agency partnerships.
2. Responsive and respected local leadership is necessary to empower knowledgeable, well organized, and enthusiastic committee members in representing and operationalizing the mandate of the network.
3. A network to promote increased parent and community engagement is challenging and complex. Stakeholders are encouraged to use innovative approaches to foster understandings for community building in diverse communities. Joint responsibility for healthy child development will facilitate school success.

DISCUSSION AND CONCLUSION

As Block (2009) described, networks are developed through a process of possibility-focused conversations involving members of the community to develop vision, purpose, and action. The FACES initiative, across three pilot project sites, was successful in creating innovative and impactful networks, which resulted in changes to the perceptions and interactions of stakeholders in early education. These FACES communities provided evidence of the efficacy of combining community and educational resources in the interest of early learning (Cheminais, 2009; Datnow, Hubbard, Mehan, 2002). The results of this study align with previous research on the power and potential of multi-agency partnerships to support early learning and transitions to school (Barclay & Boone, 1995; Christenson, 2003; Datnow et al., 2002; Glickman, et al., 2009; Yau, 2009).

The similarities and differences among the three communities were significant in their interpretations of the FACES expectations and timelines. Nevertheless, across all the communities a key accomplishment was the development of relational trust among representatives of various agencies and extending increased trust into the broader community. The development of relational trust within the steering committees supports conclusions from the literature that relational trust is critical to the development of community partnerships (Adams & Forsyth, 2013; Bryk & Schneider, 2003; Edwards-Groves, Grootenboer, Ronnerman, 2016; Tschannen-Moran, 2014; Turnbull, Turnbull, Erwin, Soodak, & Shogren, 2015). Bryk and Schneider (2002) purported relational trust is the glue that allows stakeholders to work together to enhance education and the welfare of students. The development of strong local leadership for FACES projects was undertaken at each site. The leadership took different forms in each site, depending on the community's perceived needs, but the project coordinator's role was critical to the success of the projects in all three sites. Each of the coordinators exemplified the qualities of a visionary leader with varying knowledge, skills, and experience relevant to the community context. Consistent with the literature (Haines, et al., 2015; Glickman et al., 2009; Tschannen-Moran, 2014), in all three sites, there was a process in place that enabled the development of a shared vision among participants. Cheminais (2009) showed that multi-agency partnerships need skillfully designed tools to assist in their work as they developed shared vision, common goals and undertake collective action for a continuum of care (Glickman et al., 2009).

The specific results from this research cannot be generalized to other community groups or specific sites. The results are specific to the purposes of the research, diversity of participants, their

social contexts, and three communities (Taylor & Bogden, 1984). Nevertheless, it is possible that patterns and themes that emerged in the analysis of the data regarding the multi-agency partnerships in the three communities may be applicable to other settings. The results indicate strongly that focused and shared leadership, flexibility, and trust were critical to the success of the project. The FACES initiative had emerged from research evidence supporting the value of family engagement in early learning (Pushor, 2007). The implementation of varied strategies, meeting the unique needs of each community resulted in greater involvement of families in transitions to school. These positive results provide unquestionable confirmation of the need to institutionalize the features of the FACES project, and network components as described, into the fabric of current society. Future policy and practices will hopefully provide financial and human resources to communities for collaborative efforts to engage families in their children's learning, at all levels of schooling from entry to graduation. With attention to the new key understandings, policy makers and practitioners will ensure successful transitions and experiences in school for all learners.

REFERENCES

Adam, C. M., & Forsyth, P. (2013). Revisiting the trust effect in urban elementary schools. *The Elementary School Journal, 114*, 1–2.

Barclay, K., & Boone, E. (1995). *Building a three way partnership: The leader's role in linking school, families and community.* Jefferson City, MO: Scholastic.

Barkley, K. (2008) Relational trust. *Steve Barkley Ponders Out Loud* - Blog - (Performance Learning Systems). Retrieved from http://blogs.plsweb.com/2008/12/relational-trust.html

Blankstein, A. (2011). The answer is in the room: How effective schools scale up students' success. Thousand Oaks, CA: Corwin.

Block, P. (2009). *Community: The structure of belonging.* San Francisco, CA: Berrett-Koeler.

Bruce, C., & Flynn, T. (2013). Assessing the effects of collaborative professional learning: Efficacy shifts in a three-year mathematics study, *Alberta Journal of Educational Research*, *58*(4), 691–709.

Bryk, A., & Schneider, B. (2002). *Trust in schools.* New York, NY: Russell Sage Foundation.

Bryk, A., & Schneider, B. (2003). Trust in schools: A core resource for school reform. *Educational Leadership, 60*(6), 40–45.

Cheminais, R. (2009). *Effective multi-agency partnerships: Putting every child matters into practice.* London, England: Sage.

Christenson, S. L. (2003). The family-school partnership: An opportunity to promote the learning competence of all students. *School Psychology Quarterly, 18*(4), 454–482.

Coles, R. (1993). *The call of service.* New York, NY: Houghton Mifflin.

Datnow, A., Hubbard, L., & Mehan, H. (2002). *Extending educational reform: From one school to many.* London, UK: Routledge Falmer.

Edwards-Groves, C., Grootenboer, P., & Ronnerman, K. (2016). Facilitating a culture of relational trust in school-based action research: Recognizing the role of middle learners. *Educational Action Research, 24*(3), 369–386.

Fontana, A. & Frey, J. H. (2000). The interview: From structured questions to negotiated text. In Norman K. Denzin & Yvonna S. Lincoln (Eds.), *Handbook of qualitative research* (2nd. Ed). pp. 649–656. Thousand Oaks, CA: Sage.

Glaser, B. G. (Ed.). (1992) *Basics of grounded theory analysis: Emergence versus forcing*. Mill Valley, CA: Sociology Press.

Glaser, B. & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research.* Chicago, IL: Aldine.

Glickman, C. D., Gordon, S. P., & Ross-Gordon, J. M. (2009). *The basic guide to super vision and instructional leadership*. Boston, MA: Pearson.

Haines, S. J., Gross, J. M. S., Blue-Banning, M., Francis, G. L., & Turnbull, A. P. (2015). Fostering family-school and community-school partnerships in inclusive schools: Using practice as a guide. *Research and Practice for Persons with Severe Disabilities, 40*(3), 227–239.

Handsfield, L. (2006). Being and becoming American: Triangulating habitus, field, and literacy instruction in a multilingual classroom. *Language & Literacy, 8*(2), 1–26.

Hannay, L., Wideman, R., & Seller, W. (2010). *Professional learning to reshape teaching.* Toronto, ON: Elementary Teachers' Federation of Ontario.

Johnston, M., & Kirschner, B. (Eds.) (1996). The challenges of school university collaboration (Special Issue). *Theory into Practice, 35*(3), 146–148.

Jones, S. (1985). Depth interviewing. In R. Walker (Ed.), *Applied qualitative research* (pp. 45–55). Aldershot, UK: Gower.

Kaehne, A. (2015). Multi-agency protocols as a mechanism to improve partnerships in public services. *Local Government Studies, 41*(3), 321–338.

Kemmis, S., Wilkinson, C., Edwards-Groves, I., Hardy, P., Grootenboer, Bristol, L. (2014) *Changing practices, changing education*. Sinapore: Springer

Kvale, S. (1996). *InterViews: An introduction to qualitative research interviewing.* Thousand Oaks, CA: Sage.

Lincoln Y. S., & Guba, E. G. (1985). *Naturalistic inquiry.* Newbury Park, CA: Sage Publications.

Malsch, A. M., Green, B. L., & Kothari, B. H. (2011). Understanding parents' perspectives on the transition to kindergarten. *Best Practices in Mental Health, 7*(1), 47–66.

Mangione, P. L., & Speth, T. (1998). The transition to elementary school: A framework for creating early childhood continuity through home, school, and community partnerships. *The Elementary School Journal, 98*(4), 381–397.

Merriam, S. (2009). *Qualitative research: A guide to design and implementation.* San Francisco, CA: Jossey-Bass.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis* (2nd ed.). Thousand Oaks, CA: Sage.

Palmer, P. (1998). *The courage to teach: Exploring the inner landscape of a teacher's life*. San Francisco, CA: Jossey Bass.

Pushor, D. (2007). Welcoming parents: Educators as guest hosts on school landscapes. *Education Canada, 47*(4), 6–11.

Seidman, I. (2006). *Interviewing as qualitative research: A guide for researchers in education and the social sciences* (3rd ed.). New York, NY: Teachers College Press.

Seidman, I. (2013). *Interviewing as qualitative research: A guide for researchers in education and the social sciences* (4th ed.). New York, NY: Teachers College Press.

Taylor, S. J., & Bogdan, R. (1984). *Introduction to qualitative research methods: The search for meanings*. New York, NY: John Wiley and Sons.

The Learning Partnership (TLP) (2017). *Welcome to Kindergarten.* Retrieved from *http://www.thelearningpartnership.ca/*

Tschannen-Moran, M. (2014). *Trust matters: Leadership for successful schools*. San Francisco, CA: John Wiley.

Turnbull, A. P., Turnbull, H. R., Erwin, E. J., Soodak, L. C., & Shogren, K. A. (2015). *Families, professionals, and exceptionality: Positive outcomes through partnerships and trust* (7th ed.). Upper Saddle River, NJ: Pearson.

Warnemuende, C. (2008). Helping parents. *Principal, 87*(3), 32–35

Yau, M. (2009). *Parenting and family literacy centres: Making a difference beyond early school readiness*. Etobicoke, ON: Toronto District School Board.

Yin, K. (2009). *Case study research: design and methods*. Thousand Oaks, CA: Sage.

PLANNING SCIENCE CLASSROOM FACILITIES AND RESOURCES TO IMPROVE STUDENTS' ATTITUDES

ANGEL FORD
George Washington University

PHILIP ALSUP
Liberty University

ABSTRACT

Over half of the school facilities in America are in poor condition. Unsatisfactory school facilities have a negative impact on teaching and learning. The purpose of this correlational study was to identify the relationship between high school science teachers' perceptions of the school's science environment (instructional equipment, demonstration equipment, and physical facilities) and ninth grade students' attitudes about science through their expressed enjoyment of science, boredom with science and value of science. A sample of 11,523 cases was extracted from the High School Longitudinal Study (HSLS:2009), a nationally representative survey of ninth graders located throughout the United States. The research design was multiple linear regression. The results showed a weak and yet significant relationship between the science classroom conditions and students' attitudes. Demonstration equipment and physical facilities were the best predictors of effects on students' attitudes. The results from this study show the importance of appropriate school facility and resource planning as well as areas for future research.

INTRODUCTION

Educators, policy makers, and industry leaders would like to see more qualified students moving into STEM fields. Evidence shows that American students are falling behind in STEM proficiency and interest (Chen, 2013; Peters-Burton et al, 2014). The significance of this study was to add to the existing body of knowledge by identifying educational facility condition and available resource variables that may improve high school students' attitudes toward science.

The physical conditions of high school buildings across the United States vary drastically. While many schools boast state-of-the-art facilities, many others are unattractive, unhealthy, and even unsafe. According to the National Center for Educational Statistics (NCES, 2014) over 53 percent of school facilities in the United States require improvements to be considered satisfactory. Likewise, the American Society of Civil Engineers (ASCE) gave the grade of "D" to the nation's schools due to their overall dilapidated conditions (ASCE, 2013). At a minimum, much work is needed to simply provide learning environments that are safe and comfortable for American children.

However, beyond the mere concern for safety and comfort, the condition of school facilities also affects the teaching and learning process (Cash, 1993; Bowers & Urick, 2011; Earthman & Lemasters, 2011; Tanner, 2008). Buildings in poor condition or disrepair are not as conducive to teaching and learning as those that are in satisfactory or excellent condition (Bowers & Urick, 2011; Earthman & Lemasters, 2011; Tanner, 2008). In essence, unsafe or uncomfortable conditions in schools prohibit learning, the very goal of schooling.

Earthman and Lemasters (2011) proposed a modern-day theoretical construct model, originally introduced by Cash (1993), for evaluating school building conditions (See Figure 1).

This model attempts to illustrate the relationship between school condition and the effects on work and learning in school spaces. Studies using this model or similar concepts support the proposition that teachers and students are affected by the conditions of the building and the condition of classrooms (Earthman & Lemasters, 2009; Earthman & Lemasters, 2011; Horng, 2009; Johnson, Kraft, & Papay, 2012; Johnson et al., 2011: Mompremier, 2012).

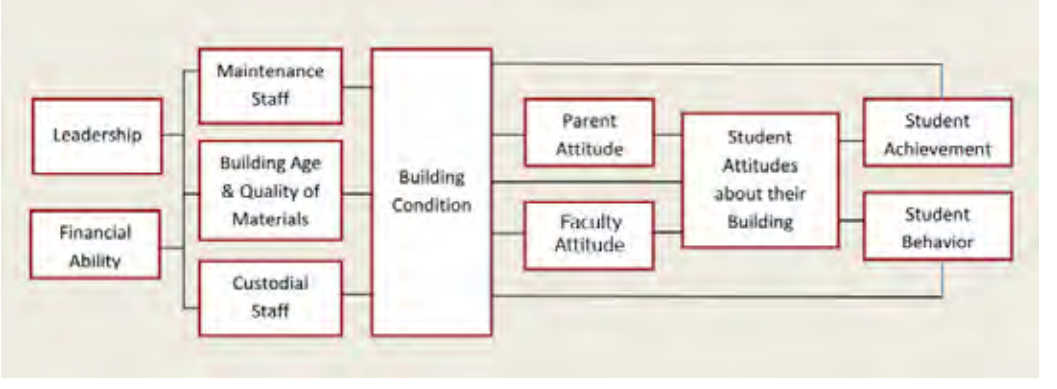


Figure 1. School building conditions are the result of various factors and those conditions affect the occupants.

It is imperative to understand how certain resources provided in learning spaces help to qualify the physical learning environment (Cleveland & Fisher, 2014; Savasci & Tomul, 2013). Educational resources, such as teaching materials, technical equipment, and student materials have been found to correlate with the quality and condition of school facilities (Kozol, 2012; Uline & Tschannen-Moran, 2008; Uline, Tschannen-Moran, & Wolsey, 2009; Uline, Wolsey, Tschannen-Moran, & Lin, 2010). Subsequently, there is evidence that the availability of educational resources correlates with academic achievement (Savasci & Tomul, 2013). Certainly, all classrooms and the learning that takes place within them stand to benefit from high-quality surroundings.

Specifically, Science education stands to benefit from improved standards for classroom upkeep and modernization. High school science classrooms are specific learning spaces within the school building requiring the consideration of design, resources and safety features (Motz et al, 2007; NSTA, 2007; NSTA, 2013). For example, science classrooms are unique in the need for lab work spaces, plenty of electrical outlets, running water, and other safety features such as eye washing stations (NSTA, 2007).

The United States Department of Education provides many guidelines for constructing quality science classrooms. However, many current science classrooms were built before modern science standards were instituted (Motz et al., 2007). Unfortunately, even new science classroom construction planning often ignores design standards that incorporate flexibility, increased space for movement, and ample equipment due to the increased costs of providing these features (Motz et al., 2007). Studies have been conducted about certain technologies and pedagogies within science classrooms (Berk et al., 2014; Campbell, Zhang, & Neilson, 2011; Chen, 2013; De Jong, Linn, & Zacharia, 2013; Freeman et al., 2014; Gilmore, 2013). However, research specifically examining the effects of high school science classroom conditions on students' attitudes about science is scarce. The focused examination of the

effects of the science classrooms and available science resources could add to the existing body of literature by increasing understanding about possible variables affecting students' attitudes toward science. Such studies will be valuable for stakeholders and decision makers when planning school building funding and resource allocation. Effective school building improvements and effective distribution of resources could encourage teachers and students and ultimately increase academic achievement.

Given the established evidence that classroom resources affect student performance, this study identifies predictive relationships between the quality of science learning spaces and ways in which this quality affects students' feelings about the field of science. The purpose was to identify the relationship between science teachers' perceptions of their classroom facilities and students' attitudes toward science using archival and nationally representative data from the High School Longitudinal Study of 2009 (NCES, 2012).

Planning for modern, effective research-based teaching methods require appropriate educational facilities and resources. The research questions examined how accurately ninth grade students' enjoyment with science, boredom with science, and value of science could be predicted by the science classroom facility conditions and the available resources of demonstration and instructional equipment.

LITERATURE REVIEW

The end target of this review was to explore how science classroom conditions and available resources affect students' attitudes toward science. Searches for available and valid studies were conducted in the areas of school building conditions, school building effects on students' academics and behavior, available educational resources and the possible effects, current science classroom conditions, and the effects of the science classroom conditions and available resources on students' attitudes.

As stated earlier, many schools in America are in poor or unsatisfactory conditions. Kozol (2012) brought this to light when he wrote about the substandard K-12 facilities in low-income communities. Many schools in poor districts lack basic elements such as appropriate climate control, working plumbing, and adequate lighting. Research conducted over the last two decades has provided evidence that unsatisfactory or poor building conditions are correlated with a decline in academic success (Earthman, 2006; Earthman, Cash & Van Berkum, 1996, Lemasters, 1997).

Generally, evidence suggests that the condition of school facilities affects occupants' attitudes and performance (Bowers & Urick, 2011; Cleveland & Fisher, 2014; Earthman & Lemasters, 2011). Science students in satisfactory facilities have been shown to score 2-4%higher than students in unsatisfactory buildings (Bullock, 2007). Similar remarkable findings have been shown in several other academic disciplines among high school students (Buckley, Schneider, & Shang, 2004; Blincoe, 2008).

Three recent studies in particular have investigated facilities' effects on student academic achievement (Uline & Tschannen-Moran, 2008; Uline et al., 2009; Uline et al., 2010). School social climate was clearly identified as a link between school facility conditions and student achievement (Uline & Tschannen-Moran, 2008). In other words, if the school facilities are in poor quality the school climate is negatively affected and this in turn has a negative impact on achievement.

A second study in the series was a multiple case study that discovered themes relating to the perceived quality of the physical school structure (Uline et al., 2009). These themes

consisted of movement, aesthetics, lighting, adaptable classrooms, and the density of the population of the building. The emerging themes showed the importance of students feeling a sense of ownership and autonomy within the learning spaces and the ability to move easily throughout the building (Uline et al., 2009). Recent literature has continued to support these findings (Baker & Bernstein, 2012; Tanner, 2015).

The third and final study in the series by Uline et al., (2010), conducted in a western state, found a strong relationship between the quality and condition of school buildings and school social climate. The use of different demographic areas for these studies supports the conclusion that effects of school building conditions are not merely regional. .

Teachers are also affected by the conditions of the school building. Current literature affirms that there is a relationship between the physical work environment of teachers and their resultant positive or negative attitudes about teaching (Earthman & Lemasters, 2009 Leigh (2012). Teachers tend to react with positive attitudes when buildings are maintained or improved (Bailey, 2009). Uline et al., (2010) also found evidence to indicate the physical school building can have an influence on a teacher's choice to work in a certain school. Teachers in less than satisfactory facilities feel less supported and are often less successful than those in facilities that provide clean, safe, and encouraging learning spaces (Ladd, 2011).

Science Classrooms and Available Science Resources

Science classrooms are not immune to the need for repair and improvement. However, an additional layer of concern for science classrooms specifically is the need for additional elements to be both functional and safe for the teachers and students to explore effectively the subjects inherent to studying science (NSTA, 2013). For example, Kozol (2012) identified a number of schools where science labs had broken plumbing, inadequate lab tables, little or no laboratory equipment, and a lack of basic supplies. Students are obviously underserved in classrooms where even the most basic science experiments cannot be adequately or safely conducted.

Early on in the research about the effects of school buildings on academic achievement, Cash (1993) stated "science achievement scores were better in buildings with better science laboratory conditions" (p. 7). Hands-on learning experiences are essential to learning science, and the need for the appropriate facilities and resources are critical for educators to provide these fundamental experiences (Berk et al., 2014; Campbell et al., 2011; Chen, 2013; De Jong et al., 2013; Freeman et al., 2014; Gilmore, 2013).

Science classrooms also need adequate space to be conducive to hands-on activities (NSTA, 2013). In order for teachers to use pedagogy that involves active engagement of students in the area of science, teachers must have access to appropriate classrooms spaces and stations in addition to appropriate demonstration and instructional equipment (NSTA, 2013).

In 2007, National Science Teachers Association (NSTA) listed declarations for science rooms that remain in place as current guidelines. These declarations include the following: science classrooms should only be used for science; enough space should be provided for each student as well as the adequate number of lab stations with access to gas, electricity, and water; correct safety equipment, correct technical, and support equipment for instruction should be provided; and adequate storage space for needed supplies should be readily available (NSTA, 2007).

First, science labs should not be used for non-science classes, especially by non-science teachers, because these teachers may not be aware of the safety precautions necessary around the specialized equipment (NSTA, 2007). Second, adequate space should be available, and therefore, a science lab should not be overcrowded. Overcrowding is a concern in any educational setting, however, it is of special concern in science classrooms, where overcrowding increases risks of accidents and injuries (Motz et al., 2007). Overcrowding includes the following factors: the number of students in the class, the workspace available to each student, and the maximum allowed occupancy for the classroom (NSTA, 2014).

Third, appropriate and adequate lab spaces and the equipment necessary for each student to participate in demonstrations are critical to provide a suitable learning environment and also to insure the highest level of safety (NSTA, 2013). The science classroom and lab should also provide workstations for students with disabilities (NSTA, 2007). Science curricula also require access to outdoor areas as part of the science classroom and curriculum, and these considerations should be part of science classroom design (NSTA, 2007). Fourth, adequate, appropriate, and secure storage should be provided for science lab chemicals that could be dangerous if handled inappropriately (Chan & Dishman, 2011, NSTA, 2007).

Technology in The Science Classroom

In addition to the science resources already mentioned, technology resources need to be considered. Classrooms for science related studies are more effective if they offer access to technology (Shen, Lei, Chang, & Namdar, 2013; Shieh, 2012). Technology has been found to help students become more interested in their science subject within the classroom as well as increasing their extra-curricular participation in science activities (Butler et al., 2014; Shen et al., 2013; Shieh, 2012). One study by Shieh (2012) found evidence to support the use of specific physics technology, Technology-Enabled Active Learning (TEAL). Another study found Technology Enhanced Model-Based Instruction (TMBI), another pedagogical technique that utilizes technology and group learning, to improve science achievement (Shen et al., 2013).

An important technology consideration of modern science classrooms is the inclusion of the required technology for virtual labs. De Jong et al., (2013) conducted a study comparing the value of physical and virtual laboratories, and found that both have advantages for learning. However, a combination of both physical and virtual lessons appeared to have the most positive impact on achievement. The use of science equipment in physical labs helped the students develop practical skills in a real-world situation that included problems with equipment, flaws in measurements, and observations over a long period of time (De Jong et al., 2013).

The virtual labs have advantages in that experiments do not need to take as much time to complete and elements such as heat and time can be altered in ways that are not possible within many physical laboratories (De Jong et al., 2013). Both physical labs and virtual labs are helpful as stand-alone features of a science classroom; however, the most advantage appeared to be when the two were used in combination.

Student Attitudes toward Science: Enjoyment, Engagement and Value

Students' attitudes toward science can be predictive of their achievement and future plans in the field; therefore, understanding variables that contribute to students' attitudes toward science could be beneficial in helping to encouraging positive attitudes and ultimately helping students to be more successful (Newell, Tharp, & Moreno, 2015). With studies showing that students' attitudes toward science, including their self-efficacy and interest in the subject,

can reflect their future participation or career plans (Newell et al., 2015; Unfried, Faber, Stanhope, & Wiebe, 2015), and with the decrease in students entering the STEM field it is more important than ever to understand and promote positive attitudes toward the sciences. With this being the case, educators at all levels are encouraged to discover ways to improve students' attitudes toward science (PCAST, 2010; Unfried et al., 2015).

Certain ways to improve attitudes have already been identified. Such as evidence showing that students find more value in their science classes when they do hands-on experimentation than if they are just passively receiving the information (Campbell et al., 2011; Gilmore, 2013). Also, evidence supports the theory that active learning increases students' interest in science and their confidence in being able to perform and apply science concepts (Berk et al., 2014). One particular study demonstrated the success of using hands-on medical problem solving to increase student self-efficacy in that area of science (Berk et al., 2014). This type of problem solving requires specific equipment and classroom space. Another study by Freeman et al., (2014) also found that with all class sizes active learning helped to increase overall academic achievement and decrease failure rates. A meta-analysis that examined 225 studies supported the positive effects of active learning for STEM classes (Freeman et al., 2014).

Campbell et al., (2011) emphasized that in order to do true science experiments, teachers and students have to access to the correct lab space and resources. They also discussed the importance of hands-on activities that cause the students to get "messy" while learning science, in order to experience the true value of the subject.

Since science classrooms vary drastically along with the school facilities around the nation, an assumption could be made that students' attitudes about science could be affected by the quality of the facilities and resources available at their schools. The inequities may be contributing to lower interest and lower achievement for those students that do not have adequate access (Carter & Welner, 2013). As stated earlier, Kozol (2012) witnessed science classrooms in deplorable conditions and without science equipment for demonstrations or experimentation. How can educators be expected to help promote positive attitudes toward science if they are unable to demonstrate and draw their students into active participation?

Summary

Although much research has been conducted in the area of school facility effects, the need remains for replicate studies, studies with larger and more nationally representative samples, studies that examine subject specific classrooms, and studies that assess individual features within educational spaces. Currently, evidence shows that the conditions of the physical school buildings affect teaching and learning (Baker & Bernstein, 2012; Cash, 1993; Lemasters, 1997; Uline et al., 2010; Earthman & Lemasters, 2011) and the health of the occupants (Angelon-Gaetz et al., 2014; Baker & Bernstein, 2012; Muscatiello, 2015) and suggest that appropriate classrooms, and resources, including appropriate and adequate technology, increase academic achievement (Baker & Bernstein, 2012; Tanner, 2015).

In addition to researching the effects of the physical facilities, this review identified the importance of appropriate equipment and resources within classrooms, specifically within science classrooms. Research was scant on the need for appropriate science equipment; however, many studies discussed the benefits of hands-on learning in science classrooms, which require flexible spaces (Duncanson, 2014) and access to equipment and supplies (Savasci & Tomul 2013). To perform many types of hands-on learning, teachers and

students need access to the appropriate instructional and demonstration equipment as well as appropriate technology.

This literature review highlights the need to focus on the effects of science classroom facilities and equipment on students' attitudes toward science. Antiquated, over-populated classrooms certainly do not provide appropriate learning spaces for teaching and learning in any discipline, especially science.

DATA AND PROCEDURES

This correlational study investigated a predictive relationship between high school science teachers' perceptions of the physical classrooms and school science resources and ninth grade students' attitudes about their current science class. The predictor variables obtained from HSLS:09 were science teachers' responses to questions about the effects of available instructional equipment, available demonstration equipment, and the available physical facilities for science instruction. Instructional equipment was defined as the equipment that students would use during instruction (NCES, 2011a). Demonstration equipment was defined as the equipment used by the teacher during instruction for the purpose of demonstrating science concepts (NCES, 2011a). The physical facilities were defined as the classroom in which the teacher was teaching the subject of science (NCES, 2011a). The criterion variables were the students' responses to questions about their attitudes toward the subject of science in which they were enrolled at the time they filled out the survey. The individual criterion variables were students' enjoyment of their science class, boredom with their science class, and perceived value of their science class (NCES, 2011a).

Participants and Setting

The High School Longitudinal Study of 2009 (HSLS:09) is the fifth and most recent in a series of longitudinal studies conducted by NCES to examine trends in education, and was intended to examine transitions of high school students from their high school freshman year into adulthood, focusing on their choices related to STEM education and careers (NCES, 2011a). The population of HSLS:09 was all ninth graders in 2009 from across the United States attending a school that had both ninth and eleventh grades (NCES, 2011a).

The sample collected for HSLS:09 consisted of a two-step process. First, 1,889 schools were randomly identified from across the nation. Of those 1,889 schools, 944 participated in the HSLS:2009. Second, approximately 25 ninth grade students were randomly chosen from each of those 944 schools (NCES, 2011a). Students with severe disabilities or barriers of language were excluded from the sample. The students were the primary unit of analysis and numbered 24,658. Science teachers were chosen for participation only if they were teaching one of the sampled students (NCES, 2011a). The variable used for this study, both from the ninth-grade students and the science teachers, was obtained in the fall of 2009 (NCES, 2011a).

Sample For The Study

The researcher of this study further refined the sample from the HSLS:09 dataset by deleting all cases with any of the missing predictor or criterion variables. The final number of cases totaled 11,523. The make-up of the student sample (N = 11,523) for the criterion variable is shown in Table 1.

Table 1: *Demographics of Student Sample*

Sex	
Male	5762
Female	5761
Race/ethnicity	
American Indian/Alaska Native	68
Asian/Pacific Islander	986
Black or African American	999
Hispanic	1627
White	6811
Other race, more than one race or missing	1032
Schools attended by Region	
Northeast	1689
Midwest	3156
South	4238
West	1719
Missing/Not Applicable	721
Schools attended by locale	
City	3002
Suburban	3264
Town	1366
Rural	3172
Missing/Not Applicable	719

The make-up of the teacher sample (N = 11,523) for the predictor variables consisted of the science teachers of the sampled students. Teacher gender, race/ethnicity and the highest degree earned are displayed in Table 2.

Table 2. *Science teacher demographics*

Sex	
Male	5066
Female	6456
Missing	1
Race/ethnicity	
Asian/Pacific Islander	219
Black or African American	423
Hispanic	395
White	10233
Other race, more than one race or missing	253
Highest degree earned	
Bachelor's degree	4911
Master's degree	5834
Educational Specialist diploma	380
Ph.D./M.D./law degree/other prof degree	398

Instrumental

The data used for this study came from two instruments that are both part of The High School Longitudinal Study of 2009 (HSLS:09). The instruments are *HSLS:09 Base Year Student* and *Base Year Science Teacher Questionnaire* (NCES, 2011a). The purpose of the HSLS:09 was to "attempt to identify factors such as motivation, beliefs, and interests that lead to academic goal-setting and decision-making" (NCES, 2011a, p. iii).

The student survey

The student survey contained questions about demographics, school related experiences, locating information, and subject related topics (NCES, 2011b). The student instrument was designed to take no more than 35 minutes and was to be administered by computer during a school day. However, a few of the surveys were administered by phone to students who were unable to complete them at school. The variables used for this study were taken from questions that consisted of four-point Likert scale responses.

The teacher survey

The web-based science teacher questionnaire was designed to take less than 30 minutes and could be completed at the convenience of the teachers (NCES, 2011b). The variables used for this study were taken from questions that consisted of four-point Likert scale responses.

Procedures

The complete dataset was acquired through the Education Data Analysis Tool (EDAT) section of the NCES website (NCES, n.d.) and was downloaded directly unto the researcher's password protected computer and then imported into SPSS 22. This dataset consisted of all surveyed students as individual cases. Each individual student case had all the variables from the student survey, the teachers' surveys, the parent's surveys, and the administrators' surveys.

The researcher identified the necessary variables to be extracted out of the 4000 plus available variables using the documentation available on the dataset (NCES, 2011a). The researcher used EDAT to create a syntax file that could be run through SPSS to sparse out the required variables from the complete HSLS:09 dataset. The researcher then ran the syntax file and extracted the necessary variables. The researcher then manually coded the remaining variables to ensure that missing data would be examined appropriately. Missing data had originally been entered as -9, -8, and -7. Through the discrete missing variable feature on SPSS those entries could be excluded from analysis. In other words, cases where responses on the necessary variables were missing from the student or science teacher were excluded from the dataset. The final number of cases with all the predictor and criterion variables equaled 11,523 cases. Once the dataset had been downloaded, extracted and prepared for the study it was ready for the data analysis.

DATA ANALYSIS AND SCREENING

Prior to data analysis, the data was screened for missing data and data inconsistencies using the sort function on SPSS. Data screening was conducted on each of the predictor variables (instructional equipment, demonstration equipment, physical facilities) and criterion variables (enjoyment of science, value of science, and boredom with science).

Box and whiskers plots were used to detect outliers on each of the predictor and criterion variables. Outliers were found on the criterion variable of students' value of science. The researcher then produced standardized z scores and found all within normal range (between -3.30 and +3.30) as defined by Warner (2013, p. 153). The lowest z-score was -2.72 and the highest z score was 1.13. Normality was then examined through a series of histograms and found tenable.

Assumption Testing

Multiple linear regression analysis required that assumptions of bivariate outliers, multivariate normal distribution, and the absence of multicollinearity be met (Warner, 2013). Scatterplots were used to determine the assumptions of bivariate outliers and multivariate normal distribution and the relationships between the criterion and predictor variables were found tenable.

The assumption of the absence of multicollinearity for the predictor variables was then assessed using the variance inflation factors (VIF). They were all within normal range of 1 and 5 indicating the predictor variables were not correlated strongly (Green & Salkind, 2011). See table 4 for variance inflation factors.

Table 4: *Variance Inflation Factors*

Variables	VIF
Predictor	
Instructional equipment - N1STUEQUIP	1.42
Demonstration equipment - N1DEMOEQUIP	1.42
Physical facilities - N1FACILITIES	1.42

After data screening was conducted and assumptions were tested, three multiple linear regressions were run to analyze each null at the 95% confidence level. A multiple regression analysis was conducted to evaluate how well science teachers' perceptions of their classroom and available resources predicted high school students' attitudes about science.

FINDINGS

Descriptive Statistics

The mean and standard deviation for each of the variables (N = 11,523) are displayed in Table 3.

Table 3: *Mean and SD for each variable*.

Variables	Mean	SD
Criterion		
Enjoyment of science - S1SENJOYING	2.20	.82
Science is a waste of time - S1SWASTE	3.12	.78
Boredom with science - S1SBORING	2.72	.89
Predictor		
Instructional equipment - N1STUEQUIP	1.88	1.04
Demonstration equipment - N1DEMOEQUIP	1.99	1.06
Physical facilities - N1FACILITIES	1.79	1.11

Research Question One

The first research question looked at students' *enjoyment* of science class and the teachers' perceptions of the instructional equipment, demonstration equipment, and the condition of the school building. The multiple linear regression, with all three of the predictors, was statistically significant, $R = .05$, $R^2 = .003$, adjusted $R^2 = .002$, $F(3,11519) = 9.68$, $p < .01$. Meaning approximately .2% of the variance of student *enjoyment* could be predicted from the linear regression of these variables. As the linear combination of predictors indicated an increase in the teacher's perception that their teaching was limited, student *enjoyment* decreased. The null hypothesis was rejected.

The best predictors of high school students' *enjoyment* of their science class were demonstration equipment ($p < .001$) and facilities ($p < .001$). Instructional equipment was not a significant predictor of students' *enjoyment* of their science class ($p = .34$). The strength of each individual predictor was analyzed through partial correlation. The partial correlations showed the relationship between the criterion variable and each predictor variable while controlling for the other predictors. These results showed that demonstration equipment ($r_{partial} = .04$) and the condition of the facilities ($r_{partial} = -.03$) were statistically significant ($p < .001$). Demonstration equipment shortage had a weak relationship with students' decreased *enjoyment* of their science classes. The correlation between facilities and students' *enjoyment* of science is significant, however it is below an extremely small effect size. Instructional equipment ($r_{partial} = - .01$) did not have a statistically significant relationship with student *enjoyment* ($p = .34$). See table 5.

Table 5: *Partial Correlations of Predictor Variables with Criterion Variable Enjoyment of Science*

Variable	B	Sig.	Partial Correlations	Sig.
Instructional Equipment	-.01	.34	-.01	.34
Demonstration Equipment	.05	.00	.04	.00
Facilities	-.03	.00	-.03	.00

Research Question Two

The second research question examined students' *boredom* of their science classes and the teachers' perceptions of the instructional equipment, demonstration equipment, and the condition of the school building. The multiple linear regression, with all three of the predictors, was statistically significant, $R = .05$, $R^2 = .003$, adjusted $R^2 = .002$, $F(3,11519) = 9.812$, $p < .01$. Meaning approximately .2% of the variance of student *boredom* could be predicted from the linear regression of these variables. The null hypothesis was rejected. The data could be interpreted as an increase in teachers' perceived limitations indicated a decrease in student *boredom*. The results are contradictory to the first null and should be interpreted with caution as the student question about *boredom* was negatively worded which can cause confusion (Johnson, Bristow, & Schneider, 2011).

The best predictors of high school students' *boredom* of their science class were demonstration equipment ($p < .001$) and facilities ($p < .001$). Instructional equipment was not a significant predictor of students' *boredom* of their science class ($p = .19$). The strength of each individual predictor was analyzed through partial correlation. See table 6. The partial correlations showed the relationship between the criterion variable and each predictor variable while controlling for the other predictors. These results showed that demonstration equipment ($r_{partial}$ = -.demonstration equipment shortages limited teaching the students' *boredom* with science increased. The correlation between facilities and students' *boredom* with science is significant, however it is however it is below an extremely small effect size. Instructional equipment ($r_{partial} = .01$) did not have a statistically significant relationship with student *boredom* ($p = .19$). See table 6.

Table 6: *Bivariate Correlations of Predictor Variables with Criterion Variable Science is Boring*

Variable	B	Sig.	Partial Correlations	Sig.
Instructional Equipment	.02	.19	.01	.19
Demonstration Equipment	-.06	.00	-.04	.00
Facilities	.04	.00	.02	.00

Research Question Three

The third research question looked at students' *value* of science class and the teachers' perceptions of the instructional equipment, demonstration equipment, and the condition of the school building. The multiple linear regression, with all three of the predictors, was statistically significant, $R = .05$, $R^2 = .003$, adjusted $R^2 = .003$, $F(3,11519) = 10.818$, $p < .01$. Meaning approximately .3% of the variance of student *value* could be predicted from the linear regression of these variables. The null hypothesis was rejected. The data could be interpreted as when the linear combination of predictors indicated an increase in teaching hindrances, student *value* of science increased. The results are contradictory to the first null and should be interpreted with caution as the student question about *value* was negatively worded which can cause confusion (Johnson et al., 2011).

The best predictors of high school students' responses to *value* or whether science is *waste of time* were demonstration equipment ($p < .001$) and facilities ($p < .01$). Instructional equipment was not a significant predictor of students' *value* of their science class ($p = .45$). The strength of each individual predictor was analyzed through a partial correlation. See table 7. The partial correlations show the relationship between the criterion variable and each predictor variable while controlling for the other predictors. These results showed that demonstration equipment ($r_{partial} = -.04$) was statistically significant ($p < .001$) and the condition of the facilities ($r_{partial} = .02$) was statistically significant ($p < .05$). As demonstration equipment shortages increased the limitations on teaching, students *valued* science less. The correlation between facilities and students' *value* of science is significant, however it is so small that it is not considered even an extremely small effect size. Instructional equipment ($r_{partial} = -.01$) did not have a statistically significant relationship with student enjoyment ($p = .45$). See table 7.

Table 7: *Bivariate Correlations of Predictor Variables with Criterion Variable Science is a Waste of Time*

Variable	B	Sig.	Partial Correlations	Sig.
Instructional Equipment	.01	.45	.01	.45
Demonstration Equipment	-.05	.00	-.04	.00
Facilities	.02	.00	.02	.01

DISCUSSION

The purpose of this correlational study was to examine whether science teachers' perceptions of their physical classroom environment and available resources had any relationship to their ninth-grade students' attitudes toward science. Evidence is growing that the physical school environment has effects on learning (Cash, 1993; Earthman & Lemasters, 2011). This study sought to add to the literature by examining a possible relationship between the effects of the physical science classroom and students' attitudes regarding science (enjoyment of science, boredom with science, and value placed on science).

A significant relationship was found among the linear combination of predictor variables and each of the criterion variables: *enjoyment, boredom,* and *value* or *perceived waste of time*. In other words, if the available equipment and facilities were inadequate, the students' attitudes were affected. The best predictors of high school students' attitudes toward their science class were demonstration equipment and facilities. However, these relationships were weak and should be interpreted with caution.

Enjoyment, an indicator of intrinsic motivation based on the self-determination theory (SDT), is one emotion or attitude that can be predictive of student engagement and academic success (Reeve, 2012). Reeve (1989) stated, "Enjoyment contributes to intrinsic motivation by sustaining the willingness to continue and persist in the activity." Evidence suggests that students' attitudes toward science, including *enjoyment*, correlate with their achievement in the subject (Newell et al., 2015). Meaning that a higher level of *enjoyment* will coincide with a higher level of achievement. Therefore, if students have higher enjoyment due to better demonstration equipment and facilities, then they would be more likely to have higher achievement. This logic would support other literature, which suggests a positive relationship between educational facility conditions and achievement (Baker & Bernstein, 2012; Blincoe, 2008; Buckley et al., 2004; Bullock, 2007; Lemasters, 1997; Uline et al., 2010; Earthman & Lemasters, 2011). Cash (1993) specifically stated that science achievement was higher in schools with higher quality science labs.

Boredom is the lack of interest and/or motivation to engage in an activity. Lack of engagement contributes to lack of achievement (Reeve, 2012), thus an increase in *boredom* could coincide with a decrease in achievement. This logic would support other literature, which suggests a positive relationship between educational facility conditions and achievement (Baker & Bernstein, 2012; Blincoe, 2008; Buckley et al., 2004; Bullock, 2007; Lemasters, 1997; Uline et al., 2010; Earthman & Lemasters, 2011). Just as with *enjoyment*, the results of this study on the variable of *boredom* suggest that facilities influence student boredom.

Value, or students' perceived importance or usefulness of science, is important to science achievement (Newell et al., 2015). The higher value students place on science could coincide with their effort and engagement (Newell et al., 2015; Reeve, 2012). Just as with

enjoyment and *boredom*, the results of this study on the variable of *value* are in support of studies that suggest that facilities have effects on occupants (Baker & Bernstein, 2012; Blincoe, 2008; Buckley et al., 2004; Bullock, 2007; Lemasters, 1997; Uline et al., 2010; Earthman & Lemasters, 2011).

IMPLICATIONS

Studies have shown that school facility conditions affect the occupants (Bowers & Urick, 2011; Cash, 1993; Cleveland & Fisher, 2014; Earthman & Lemasters, 2011; Lemasters, 1997, Tanner, 2015) and that resources available can be correlated with the condition of facilities (Carter & Welner 2013; Kozol, 2012). Most educational facility studies have been conducted at a regional or state level (Tanner, 2015) and few have been conducted that specifically examine science classrooms. This study added to the body of knowledge by examining the relationship of a nationally representative sample of science teachers' perceptions of the physical high school science classroom environment and their ninth-grade students' attitudes about science.

Educators are encouraged to increase the interest and achievement of students in science fields; therefore, it is imperative to understand the factors that contribute to students' positive attitudes and success. This study helps to identify variables that appear to have an impact on students. Demonstration equipment, the equipment used by the teacher during instruction, appeared to have the most impact. These findings suggest that different types of science classroom equipment might play different roles in students' enjoyment and value of science. These findings also suggest that certain types of equipment in the science classroom have more impact than the physical classroom conditions.

LIMITATIONS

The threats to internal validity include all unknown variables that affected the responses of the teachers and students. There are many variables that studies such as these are unable to control for that would affect the teachers' perceptions of their classrooms and the students' attitudes toward science. The internal threat of subjectivity is also a concern as the survey questions for the teachers and students were about their perceptions. There is also the concern about the unclear definition of the variables chosen for this study as well as the use of the word attitude to encompass those variables.

On the teachers' survey the options available for the teachers to choose about the condition of the facilities and the availability of resources were not based on pre-defined levels. The school buildings could have been considered satisfactory or unsatisfactory with a standardized assessment and the teachers could have indicated the opposite conditions in their classrooms. Two teachers with similar classrooms and available resources could have answered the questions differently. There was no indication about important classroom conditions such as whether the classrooms were overcrowded or whether the classrooms being used for science were indeed designed for science instruction. There was also no indication as to whether or not classrooms were unsafe for any reason. A concern also exists about the reasoning of the high number of teachers who chose not to fill out the surveys.

Another limitation could have been the timing of the survey participation as it was filled out early in the ninth-grade year. Students could have been answering the questions based on their previous experiences in science rather than their current classroom experiences. Research also indicates that student attitudes toward science are established before they

enter high school (Newell et al., 2015). The students' attitudes toward science could have been affected by many variables outside of the school condition and available resources.

Another consideration about the surveys is that both the student and teacher surveys used positively and negatively worded questions. Evidence shows that negatively worded questions can lead the answers to be more negative and they can confuse those taking the survey (Johnson et al., 2011). For the variables used for this study the students had one positively worded question and two negatively worded and the teacher had three negatively worded. This could have affected the way these questions were completed. Another concern about the results is that the statistical significance could have been due to the sheer number of cases (N = 11,523); however, the consistency with the three research questions suggests this is not likely.

The threats to external validity or whether the study is applicable to other groups include the fact that the dataset used for this study was from 2009 and the responses of students and or teachers being asked the same questions today or in the future might be different.

RECOMMENDATIONS FOR PLANNING AND FUTURE RESEARCH

Even though extensive planning already goes into the design of school facilities and many studies have already been conducted on the effects of school facilities that have influenced this planning, many gaps remain. This study contributes to the knowledge however, by no means completely fills in a gap. However, as studies advance the knowledge and these gaps are filled, planning and allocating for construction and distribution of resources will become more informed and more effective. Evidence has shown that planning classroom design and layouts appropriately can increase teachers' ability to choose the best teaching methods in order to engage students (Ford, 2016). This study raises awareness that science classrooms have specific needs to accommodate effective pedagogies to inspire and motivate students to remain interested in science fields.

One idea for future study of facilities in general would be to establish a nationwide dataset that investigates specific school building features and elements of school buildings and examines correlates of those variables with occupants' performance, behaviors, and attitudes. Specific types of classrooms could be examined, including science classrooms. Such a database would be strengthened if it were based on a specific theory that pertains to performance and attitudes which could offer a clearer understanding of combinations of variables. Such theories that could be helpful include, however, are not limited to Self-Determination Theory (SDT), (Deci, Vallerand, Pelletier, & Ryan, 1991) or expectancy-value theory (EVT), (Eccles et al., 1983). Examining students' attitudes in light of SDT could focus on occupants' feelings of well-being and levels of autonomous motivation (Ryan & Deci, 2017). Examining student attitudes in light of EVT could focus on their beliefs about the occupants' competence on a given task and the value of that given task (Wigfield & Eccles, 2000). The use of either of these theories in specifically examining students' attitudes toward science could be helpful as students' attitudes are often predictive of their achievement (Newell et al., 2015).

Baker and Bernstien (2012) as well as Tanner (2015) suggest changing the focus of school facility studies from those focused on whether school buildings are adequate or inadequate to those that are functional and high performing. Understanding about individual building elements and combinations of elements may further this research. With a nationwide

dataset that focuses on facility questions, it might be easier to control for mediating variables such as school climate, socio-economic variables, community engagement, etc. A national study that was conducted longitudinally such as the one used for this study may be able to investigate relationships between facilities and occupants at different ages and grade-levels.

Future studies on the effects of science classroom conditions, available resources, and available technology on student attitudes could be conducted using different grade levels, and different ages of students. Such studies could provide more understanding about individual elements and also subject specific elements such as those necessary for biology, physics, earth science, or chemistry. With such studies, it would be critical to include an investigation of technology within the science classroom. With the continued increase in technology use this will be an ever-changing area in need of analysis.

Additional studies could be conducted that investigate how school building conditions affect teacher retention. Teacher retention is a concern in our nation especially with math and science teachers. Understanding how the physical school conditions affect teachers' health, attitudes, performance, and ultimately retention rates could be helpful. If building conditions could be identified that affect teacher turnover, then changes and/or improvements might be planned for that would remedy what is becoming an epidemic problem in America. Buckley et al. (2005) examined teachers' reasons for leaving specific schools, or for leaving the profession of teaching entirely, and found the quality of school facilities did influence their decisions.

Any studies that increase the understanding of school building conditions and more specifically those elements and features that have the most impact on occupants will increase the knowledge available to facility planners and maintainers. This study demonstrates that science classroom conditions and the available resources within those classrooms have an effect on the students' attitudes towards science. Planners will do well to be aware of this and to conduct further investigations into the elements and features that will have the most impact.

CONCLUSION

All the null hypothesis in this study were rejected yet the relationships between the conditions in science classrooms and students' attitudes were extremely weak. These results suggest that available science equipment and science classroom facilities do have a relationship with students' attitudes of *enjoyment*, *boredom* and whether students *value* science or perceive it is a waste of time. For the sake of this conclusion the three attitudes of *enjoyment*, *boredom*, and *value* will be combined and discussed as students' attitudes toward science. This is being assumed even though Reeve (1989) suggested a clear difference between enjoyment and interest, which can be seen as a value and/or the opposite of *boredom*, and the variance inflation factor (VIF) scores for these variables also clearly showed that each variable measured a unique aspect of attitude. The relationships between the predictors and each criterion variable were extremely weak; however statistically significant, meaning the conditions of the science facilities and available resources did affect different aspects of students' attitudes.

Extensive research exists on students' attitudes based on self-determination theory (SDT) and for that reason this researcher proposes using this theory to further examine these results considering what is known about students' attitudes and motivations. SDT proposes that optimal motivation occurs when a person feels autonomy, competence, and relatedness to others (Deci & Ryan, 1985). This researcher proposes that regardless of the physical

conditions of the science classroom and adequacy of available resources, the influence of teachers who can promote the feelings of autonomy, competence, and relatedness within students outweighs these variables. This does not mean that educational facility conditions should not be considered; however, it suggests that many other variables are influencing classroom outcomes. In optimal conditions, teachers would not need to accommodate for poor facilities or lack of appropriate equipment.

The student-teacher dialectical framework within self-determination theory explains that the learning environment either supports or thwarts the positive emotions and positive attitudes of students such as those being examined in this study that in turn affect motivation (Reeve, 2012). This framework does not consider the physical facilities; however, evidence is available that shows the physical condition of learning spaces and the available resources contribute to the overall classroom environment and the climate within the school (Uline et al., 2010). Evidence also shows that the overall climate within the school influences the occupants (Uline et al., 2010).

In addition, studies are available on the effects of redesigned science classrooms at the college level. Improvements to college science classrooms have shown to produce increases in interest, engagement, and achievement (Park & Choi, 2014). Studies of college science classrooms have also shown that the more a classroom environment promotes student autonomy both socially and physically, the more likely students are to have positive attitudes about the subject (Ratelle et al., 2007).

With the considerations about the effects of the school climate it could be surmised that although the physical conditions of the learning spaces do influence the students, there are other variables that may have more of an effect. It can be assumed that other variables whether they correlate with the school conditions or not, have a stronger influence over students' attitudes. The climate of the classroom, whether it is in poor physical condition or not, can be more influenced by the attitude of the teacher and the techniques the teacher employs. Science teachers could be utilizing teaching methods that encourage students' feeling of autonomy, competence, and relatedness through maintaining students' attention and engagement.

The fact that demonstration equipment, the equipment used by the teacher, had the most predictive value may mean that if a science teacher has adequate demonstration equipment he is able to engage the students in learning the subject regardless of whether the classroom conditions are satisfactory or whether there is adequate instructional equipment. The demonstrations led by the teacher, if done effectively, could be successfully meeting the needs as identified by SDT. The teaching techniques used during demonstration could involve volunteers (autonomy), could engage the whole class (relatedness) and could help all the students feel successful (competence).

Instructional equipment used by the students during instruction, did not appear to have a significant relationship with any of the examined attitudes. This appears to be contradictory to studies that demonstrate that hands-on learning is preferred by students (Berk e al., 2014; Gilmore, 2013; Hofstein & Lunetta, 2003); however, there is evidence that experiments can be time consuming and even frustrating to some students (Hofstein & Lunetta, 2003).

Even though the effects of facilities and available resources in this study appear to have only an extremely small effect size on student attitudes, a consistent statistical significance was found with each null. With this as a consideration, and evidence provided from a long

list of other studies that facilities affect occupants, it is imperative to continue examining how school facilities and resources affect occupants and how these effects need to be considered when planning the design and redesign learning spaces.

REFERENCES

American Society of Civil Engineers (ASCE). (2013). *2013 Report Card for America's Infrastructure.* Reston, VA: American Society of Civil Engineers. Retrieved from http://www.infrastructurereportcard.org/a/#p/schools/overview

Bailey, J. A. (2009). *A synthesis of studies pertaining to school building condition, student achievement, student behavior, and student attitude*. (Unpublished doctoral dissertation). Virginia Polytechnic Institute and State University, Blacksburg, VA.

Baker, L., & Bernstein, H. (2012). The impact of school buildings on student health and performance*. A Call for Research.* McGraw-Hill Research Foundation, New York, NY.

Berk, L. J., Muret-Wagstaff, S. L., Goyal, R., Joyal, J. A., Gordon, J. A., Faux, R., & Oriol, N. E. (2014). Inspiring careers in STEM and healthcare fields through medical simulation embedded in high school science education. *Advances in physiology education, 38*(3), 210-215.

Blincoe, J. M. (2008). The age and condition of Texas high schools as related to student academic achievement. (Unpublished doctoral dissertation). The University of Texas at Austin.

Bowers, A. J., & Urick, A. (2011). Does high school facility quality affect student achievement?: A two-level hierarchical linear model. *Journal of Education Finance, 37*(1), 72-94.

Buckley, J., Schneider, M., & Shang, Y. (2004). *Los Angeles unified school district school facilities and academic performance.* Washington, DC: National Clearinghouse for Educational Facilities.

Buckley, J., Schneider, M., & Shang, Y. (2005). Fix it and they might stay: School facility quality and teacher retention in Washington, DC. *The Teachers College Record*, *107*(5), 1107-1123.

Bullock, C. C. (2007). *The relationship between school building conditions and student achievement at the middle school level in the Commonwealth of Virginia* (Doctoral dissertation, Virginia Polytechnic Institute and State University).

Butler, A. C., Marsh, E. J., Slavinsky, J. P., & Baraniuk, R. G. (2014). Integrating cognitive science and technology improves learning in a STEM classroom. *Educational Psychology Review, 26*(2), 331-340.

Campbell, T., Zhang, D., & Neilson, D. (2011). Model based inquiry in the high school physics classroom: An exploratory study of implementation and outcomes. *Journal of Science Education and Technology, 20*(3), 258-269.

Carter, P. L., & Welner, K. G. (2013). *Closing the opportunity gap: What America must do to give every child an even chance.* New York: Oxford University Press.

Cash, C. (1993). *Building condition and student achievement and behavior.* (Unpublished doctoral dissertation). Virginia Polytechnic Institute and State University. Blacksburg, VA.

Chan, T. C., & Dishman, M. (2011). Maintaining a safe and healthy school environment for learning. *The ACEF Journal, 1*(1), 5-13.

Chen, X. (2013). STEM attrition: College students' paths into and out of STEM fields. *Statistical Analysis Report. NCES 2014-001*. National Center for Education Statistics.

Cleveland, B., & Fisher, K. (2014). The evaluation of physical learning environments: a critical review of the literature. *Learning Environments Research*, *17*(1), 1-28.

Deci, E. & Ryan, R. (1985). *Intrinsic motivation and self-determination in human behavior.* New York: Pantheon.

Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, *26*(3-4), 325-346.

De Jong, T., Linn, M. C., & Zacharia, Z. C. (2013). Physical and virtual laboratories in science and engineering education. *Science, 340*(6130), 305-308.

Earthman, G. I. (2006). *My Classroom Appraisal Protocol©.* Survey Instrument. Blacksburg, VA: Virginia Polytechnic Institute and State University.

Earthman, G. I., Cash, C. S., & Van Berkum, D. (1996). Student achievement and behavior and school building condition. *Journal of School Business Management, 8*(3), 26-37.

Earthman, G. I., & Lemasters, L. K. (2009). Teacher attitudes about classroom conditions. *Journal of Educational Administration, 47*(3), 323-335.

Earthman, G. I., & Lemasters, L. K. (2011). The influence of school building conditions on students and teachers: A theory-based research program (1993-2011). *The ACEF Journal, 1*(1), 15-36.

Eccles, J., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J., and Midgley, C. (1983). Expectancies, values and academic behaviors. In Spence, J. T. (ed.), *Achievement and Achievement Motives*, W. H. Freeman, San Francisco.

Ford, A., (2016). Planning classroom design and layout to increase pedagogical options for secondary teachers. *The Journal of the International Society for Educational Planning, 23*(1), 25-34.

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences, 111*(23), 8410-8415.

Gall, M. D., Gall, J. P., & Borg, W. R. (2007). *Educational research: An introduction* (8th Ed.). Boston: Pearson.

Gilmore, M. (2013). Improvement of STEM education: Experiential learning is the key. *Mod. Chem. Appl, 1*, e109.

Green, S. B., & Salkind, N. J. (2011). *Using SPSS for Windows and Macintosh: Analyzing and understanding data. (6th ed.).* Upper Saddle River, NJ: Prentice Hall.

Hofstein, A., & Lunetta, V. N. (2004). The laboratory in science education: Foundations for the twenty-first century. *Science Education, 88*(1), 28-54.

Horng, E. L. (2009). Teacher tradeoffs: Disentangling teachers. *American Educational Research Journal 46*(3), 690-717.

Johnson, J. M., Bristow, D. N., & Schneider, K. C. (2011). Did you not understand the question or not? An investigation of negatively worded questions in survey research. *Journal of Applied Business Research (JABR), 20*(1).

Johnson, S. M., Kraft, M. A., & Papay, J. P. (2012). How context matters in high-need schools: The effects of teachers' working conditions on their professional satisfaction and their students' achievement. *Teachers College Record, 114*(10), 1-39.

Kozol, J. (2012). *Savage inequalities: Children in America's schools*. New York: Broadway Books.

Ladd, H. (2011). Teachers' perceptions of their working conditions: How predictive of planned and actual teacher movement? *Educational Evaluation and Policy Analysis 33*(2), 235-261.

Leigh, R. M. (2012). *School facility conditions and the relationship between teacher attitudes.* (Unpublished doctoral dissertation). Virginia Polytechnic Institute and State University, Blacksburg, VA.

Lemasters, L. K. (1997). *A synthesis of studies pertaining to facilities, student achievement and student behavior.* (Unpublished doctoral dissertation). Virginia Polytechnic Institute and State University, Blacksburg, VA.

Mompremier, N. F. (2012). Battle for the school grounds: A look at inadequate school facilities and a call for a legislative and judicial remedy. *Howard LJ*,*56*, 505.

Motz, L. L., Biehle, J. T., & West, S. S. (Eds.). (2007). *NSTA guide to planning school science facilities.* NSTA Press.

Muscatiello, N., McCarthy, A., Kielb, C., Hsu, W. H., Hwang, S. A., & Lin, S. (2015). Classroom conditions and CO2 concentrations and teacher health symptom reporting in 10 New York State schools. *Indoor air, 25*(2), 157-167.

National Center for Education Statistics (NCES). (2000). *Condition of America's public school facilities*. Retrieved from http://nces.ed.gov/pubs2000/2000032.pdf

National Center for Education Statistics. (2011a). *High school longitudinal study of 2009 (HSLS:09) base-year data file documentation*. Retrieved from http://nces.ed.gov/surveys/hsls09/

National Center for Education Statistics (NCES). (2011b). *High school longitudinal study of 2009 (HSLS:09) base-year field test report*. Retrieved from http://nces.ed.gov/pubs2010/201001.pdf

National Center for Education Statistics (NCES). (2012). *High school* Retrieved from http://nces.ed.gov/surveys/hsls09/

National Center for Education Statistics (NCES). (2014). *Condition of America's public school facilities.* Retrieved from http://nces.ed.gov/pubs2014/2014022.pdf

National Center for Education Statistics (NCES). (n.d). *Education Data Analysis Tool (EDAT).* Retrieved from https://nces.ed.gov/edat/

National Science Teachers Association (NSTA). (2007). *NSTA position statement: The integral longitudinal study of 2009. The role of laboratory investigations in science instruction*. Retrieved from http://www.nsta.org/about/positions/highschool.aspx

National Science Teachers Association (NSTA). (2013). *NSTA Reports: Planning and investing in safe science facilities*. Retrieved from http://www.nsta.org/publications/news/story.aspx?id=59988

National Science Teachers Association (NSTA). (2014). *Overcrowding in the instructional Space.* Retrieved from http://www.nsta.org/docs/OvercrowdingInTheInstructionalSpace.pdf

Newell, A. D., Zientek, L. R., Tharp, B. Z., Vogt, G. L., & Moreno, N. P. (2015). Students' attitudes toward science as predictors of gains on student content knowledge: benefits of an after-school program. *School Science and Mathematics, 115*(5), 216-225.

Park, E. L., & Choi, B. K. (2014). Transformation of classroom spaces: traditional versus active learning classroom in colleges. *Higher Education, 68*(5), 749-771.

Peters-Burton, E. E., Lynch, S. J., Behrend, T. S., & Means, B.B. (2014). Inclusive STEM high school design: 10 critical components. *Theory Into Practice, 53*(1), 64-71.

President's Council of Advisors on Science and Technology (PCAST). (2010). (Executive Summary) *REPORT TO THE PRESIDENT Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Math (STEM) for America's Future.* Retrieved from http://www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-stemed-execsum.pdf

Ratelle, C. F., Guay, F., Vallerand, R. J., Larose, S., & Senécal, C. (2007). Autonomous, controlled, and amotivated types of academic motivation: A person-oriented analysis. *Journal of Educational Psychology, 99*(4), 734-746.

Reeve, J. (1989). The interest-enjoyment distinction in intrinsic motivation. *Motivation and Emotion*, *13*(2), 83-103.

Reeve, J. (2012). A self-determination theory perspective on student engagement. *In Handbook of Research on Student Engagement.* New York, Springer.

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications.

Savasci, H. S., & Tomul, E. (2013). The relationship between educational resources of school and academic achievement. *International Education Studies, 6*(4), 114-123. Retrieved from http://search.proquest.com/docview/1447223066?accountid=12085

Shen, J., Lei, J., Chang, H. Y., & Namdar, B. (2014). *Technology-enhanced, modeling-based instruction (TMBI) in science education. In Handbook of Research on Educational Communications and Technology (pp. 529-540).* Springer New York.

Shieh, R. S. (2012). The impact of Technology-Enabled Active Learning (TEAL) implementation on student learning and teachers' teaching in a high school context. *Computers & Education, 59*(2), 206-214.

Tanner, C. K. (2008). Explaining relationships among student outcomes and the school's physical environment. *Journal of Advanced Academics 19*(3), 444-471.

Tanner, C. K. (2015). *Effects of school architectural designs on students' Accomplishments: A meta-analysis.* Retrieved from the Education Facilities Clearinghouse (EFC): http://www.efc.gwu.edu/library/effects-of-school-architectural-designs-on-students-accomplishments-a-meta-analysis/

Uline, C. L., Tschannen-Moran, M. (2008). The walls speak: The interplay of quality facilities, school climate, and student achievement. *Journal of Educational Administration, 46*(1), 55-73.

Uline, C. L., Tschannen-Moran, M., & Wolsey, T. D. (2009). The walls still speak: The stories occupants tell. *Journal of Educational Administration*, *47*(3), 400-426.

Uline, C. L., Wolsey, T. D., Tschannen-Moran, M., & Lin, C. D. (2010). Improving the physical and social environment of school: A question of equity. *Journal of School leadership*, *20*(5), 597-632.

Unfried, A., Faber, M., Stanhope, D. S., & Wiebe, E. (2015). The development and validation of a measure of student attitudes toward science, technology, engineering, and math (S-STEM). *Journal of Psychoeducational Assessment,* 0734282915571160.

Warner, R. M. (2013). *Applied statistics: From bivariate through multivariate techniques* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Wigfield, A., & Eccles, J. S. (2000). Expectancy–value theory of achievement motivation. *Contemporary educational psychology*, *25*(1), 68-81.

EDUCATIONAL TECHNOLOGIES FOR K-12 LEARNERS: WHAT DIGITAL NATIVES AND DIGITAL IMMIGRANTS CAN TEACH ONE ANOTHER

CAITLIN RIEGEL
Niagara University

ROSINA METE
Niagara University

ABSTRACT

As technology continues to evolve, the gap between those who have grown up with technology (digital natives) and those who have not (digital immigrants) continues to widen. This gap is very present in the K-12 classroom, where both digital natives (students) and digital immigrants (teachers) work together. This gap highlights a stigma associated with each group; digital natives are comfortable with technology and digital immigrants are not. However, just as digital natives can teach digital immigrants a lot in terms of using, navigating, and harnessing the efficiency of technology, digital immigrants can offer digital natives a lot in terms of learning to use, troubleshooting, and operating without technology.

INTRODUCTION

Technology has not only become a powerful tool in daily life, but has had a large impact on education (Mete, Riegel, Kozen, & Polka, 2017). With technologies allowing for increased learning efficiency, faster and more reliable information, professional presentations of student work, and diverse approaches to learning, the use of technology in K-12 has become "central to teaching and learning" (D'Angelo & Woosley, 2007, p. 462; Li, 2007; Nickerson & Zodhiates, 2013). It follows that K-12 educators would harness educational technology as a teaching tool in the classroom, so students can "harness technology to be effective problem solvers, collaborators, communicators, and creators" (National Education Association [NEA], 2014, p. 31). However, a fundamental problem concerning the way teachers and students view and use technology has limited technology's effectiveness in the classroom; "instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language" (Prensky, 2001, p. 2).

Although the increased use of technology has supported, assisted and even enhanced the act of learning (Selwyn, 2010), it has also widened the gap between those who have grown up with technology (digital natives) and those who have not (digital immigrants) (Prensky, 2001). The information discussed with in the article generally assumes that the majority of digital immigrants work as teachers in K-12 classrooms, while students make up the majority of digital natives in the same settings. However, the authors acknowledge that these two groups are not distinct and may overlap.

In 21st century classrooms, where teachers often have not grown up with the technology being used, it follows that teachers often assume the role of digital immigrants and students often assume the role of digital natives. Since both digital natives (students) and digital immigrants (teachers) work together in the K-12 classroom, it is vital that both groups use their strengths to enhance each other's knowledge pertaining to technology. However, the stigma associated with each group (i.e. digital natives are comfortable with technology and digital immigrants are not) may keep reciprocal learning from occurring.

To harness the strengths of both digital natives and digital immigrants in the K-12 classroom, the characteristics that make both digital natives and digital immigrants unique are outlined below. Given these distinctive qualities, the learnings that digital natives can teach digital immigrants in terms of using, navigating, and harnessing the efficiency of technology, and the learnings that digital immigrants can offer digital natives in terms of learning to use, troubleshooting, and operating without technology are discussed. Additionally, various examples of technology tools that appeal to digital natives and digital immigrants are identified in an effort to demonstrate the importance of informed technology selection. Finally, to overcome the stigma associated with digital immigrants and digital natives, the mindset of each group is discussed, with an emphasis on how to overcome the stigma and allow for reciprocal learning to occur.

CHARACTERISTICS

Prensky (2001) first characterized two different groups of individuals as digital immigrants and digital natives. He emphasized that the main discrepancies between the two groups were differences in technology usage plus language and communication. Prensky theorized that the integration of a technology-rich environment led to "hypothesized changes in the brain structure which meant young people think and process information in fundamentally different ways compared to older generations" (as cited in Helsper & Eynon, 2009, p.1). The main characteristics of both groups will be outlined below in further detail.

Digital Immigrants

Digital immigrants are considered individuals who were born prior to the influx of technology, specifically computer use, the Internet, and smartphones. The term immigrants corresponds to their adoption of web technologies or "immigrating" to the technological environment. A summary of their characteristics may be found in Figure 1. Their preference is to speak face-to-face as opposed to texting or using an instant messenger service. Similarly, they would rather interact with one individual or a few people rather than a large group. These patterns focus on the importance of human connection in person as opposed to connecting to an individually electronically.

Within the K-12 classroom, digital immigrants are often the teachers or instructors. They may prioritize face-to-face interactions among students over implementing technological educational aids. For example, utilizing in-person group work as opposed to allowing students to collaborate within the classroom via Google drive. The latter is a file-sharing program which allows users to virtually edit and share documents.

Digital immigrants' learning patterns focus on logical rationale. An example would be if a digital immigrant was speaking to technical support via the telephone. If the call was regarding an email app on their phone to send an email, they may not understand that an arrow represents "send" as opposed to being specifically labeled as such.

Figure 1: Digital Immigrant Characteristics (Unicheck, 2015)

Digital Natives

Digital natives are individuals who were born during or after the integration of technology within the classroom, or the "digital age." A list of their characteristics is outlined in Figure 2. Prensky originally defined a digital native as being born on or after 1980, however, some scholars define individuals born between 1980 and 1990 as the "first generation of digital natives" (Helsper & Eynon, 2009, p.7). For these researchers, a second-generation digital native is born after 1990. Therefore, one may argue that teachers may include digital natives and digital immigrants.

Digital natives are "fluent in acquiring and learning all sorts of new technology" (Mete et al., 2017, p.69). They are categorized as intuitive learners as they grew up with technological jargon and can quickly adapt to technological advances. An example would be the use of iPads within the classroom. iPads are becoming more common within the K-12 classroom to help promote learning and often younger students can surpass the teacher's knowledge within a few weeks (Grant & Barbour, 2013; Reid & Ostashewski, 2011). Digital natives' intuition also stems from their consistent use of electronic devices – it is estimated that in America, nearly 60% of 12-year-olds own a personal cell phone.

Due to their multi-use of many of the tools, digital natives are comfortable with the quick transfer of information and multi-task with ease, in comparison to their digital immigrant counterparts. Within the K-12 classroom, the digital natives, who are most likely the students, are more comfortable with the integration of multimedia such as audio, video, and images to promote learning.

The increased usage of social media among digital natives, specifically Facebook, Twitter, and Instagram, as well as Snapchat provide them with quick and easy methods for communication (Williams, Crittenden, Keo, & McCarty, 2012). This also highlights their preference for electronic interactions as opposed to face-to-face interactions. Digital natives enjoy social interactions, however, would prefer to use social media and other apps to facilitate communication. This is also evidenced in their usage of emoticons or emojis (small graphics in text) and slang in text (Williams et al., 2012).

Figure 2: Digital Native Characteristics (Unicheck, 2015)

RECIPROCAL LEARNING

Throughout the past few decades, education has evolved into a two-way street where teachers and students teach and learn together (Branscombe, Goswami, Schwartz, & Bowen, 1992). Just as teachers have a wealth of information to offer students, students have a great deal of knowledge to offer teachers. This reciprocal learning fosters an environment where all participants in education can benefit from the knowledge of everyone in the classroom. When it comes to technology, this notion of reciprocal learning holds true; both digital natives and digital immigrants have a lot to teach one another. Given the unique characteristics of both digital natives and digital immigrants outlined above, it follows that the strengths of each group can be leveraged to enhance technology in the K-12 classroom.

What Digital Immigrants Can Teach Digital Natives

Since digital immigrants did not grow up using technology to teach and learn in the classroom, they are able to offer digital natives insight into learning to use, troubleshooting, and operating without technology. Specifically, digital immigrants can teach digital natives how to carry on when technology fails. As individuals who were born during the digital age, digital natives rely on the availability of digital resources such as wi-fi, apps, websites, etc. (International Society for Technology in Education [ISTE], 2017). With their teaching preparation focused on pedagogy not involving technology, digital immigrants are able to navigate teaching and learning in the case that technology fails.

Digital immigrants can also teach digital natives about the importance of human contact in the educational process. As individuals who are always on or attached to a phone or other device, digital natives may miss social cues or nonverbal communication that occurs during human interactions (Drago, 2015). With the majority if not all of their teaching experience in face-to-face settings, digital immigrants can demonstrate the impact and importance of nonverbal communication (e.g., body language, tone of voice, facial expression, etc.) in educational interactions.

Additionally, digital immigrants can teach digital natives about the limitations of technology. As individuals who are intuitive learners who focus on learning underlying principles or general ideas, digital natives may not recognize the difficulties that digital immigrants face when it comes to working with technology (English & Gordon, 2004). Using themselves as examples, digital immigrants can explain how logical learners focus on learning facts in a linear manner, highlighting some restrictions and shortcomings of specific technologies.

Digital immigrants can also teach digital natives how to navigate and use traditional sources (e.g. books, journals, newspapers, etc.) to gather information. As individuals who are multimedia oriented, digital natives may not be aware of the surplus of information contained in traditional sources and how to critically analyze the credibility of media sources (Johnson & Kaye, 1998). Since the sources available to digital immigrants during their own education did not include multimedia sources, their innate familiarity with traditional sources can provide digital natives with additional reliable sources for information.

Finally, digital immigrants can teach digital natives how to simplify activities that rely too much on technology. As individuals who multitask and often switch tasks, digital natives may get caught up in distracting tasks like E-mailing, web browsing, and/or instant messaging and lose sight of their purpose (Ellis, Daniels, & Jauregui, 2010; Hembrooke & Gay, 2003). With an outside perspective from an individual who grew up focusing on one task at a time, digital immigrants can suggest simpler approaches to activities such as communication or studying.

What Digital Natives Can Teach Digital Immigrants

Since digital natives grew up with technology, they are able to offer digital immigrants insight into using, navigating, and harnessing the efficiency of technology. Specifically, digital natives can teach digital immigrants how to streamline classroom processes. As individuals who must adopt technologies, digital immigrants may not have had the exposure to various technologies that can significantly influence the efficiency of the classroom (ISTE, 2017). With a constant exposure to and new technologies, digital natives can introduce and teach digital immigrants to technologies that can help with classroom processes like attendance, classroom management, data analysis, etc.

Digital natives can teach digital immigrants how to engage and motivate younger generations by using familiar technology in educational ways. As individuals focus on one task at a time, digital immigrants may miss judge 21st century students as distracted or unmotivated rather than unengaged due to the method of teaching (Borsheim, Merritt, & Reed, 2008). Since they were board in the digital age, digital natives can offer suggestions for technology (i.e., video games, interactive presentations, communication boards, etc.) that they would prefer and enjoy using in the classroom.

Additionally, digital natives can teach digital immigrants how to easily collect classroom data for student evaluation and data-based decision making. As individuals who get information from traditional sources, digital immigrants may rely heavily on time consuming summative assessments (Garrison & Ehringhaus, 2009). Using their familiarity with digital resources, digital natives can help introduce immediate formative assessment in the form of online polling and instant response techniques into the classroom.

Digital natives can also teach digital immigrants how to educate students in a manner that is comfortable to them. As individuals who prefer to talk in person, digital immigrants may not consider initiatives like the flipped classroom, that can increase students' accountability and achievement (Amresh, Carberry, & Femiani, 2013). Since digital natives are intuitive learners, they can identify the multimedia sources where they get most of their information from and promote the use of those sources within the classroom.

Finally, digital natives can teach digital immigrants how to make the classroom more accessible using technology for students with exceptional learning needs. As logical learners who may focus on technology in a linear manner, digital immigrants may not be able to see the potential of a technology to assist students and help differentiate material (Netherton & Deal, 2006). With an

innate ability to think creatively about technology, digital natives can suggest alternative approaches to technology use in an effort to make the classroom and material more accessible.

TECH TOOLS

Prensky (2005) states that instructors need to know the technology students can use. As mentioned before, education is a two-way street, meaning that students also need to know the technology instructors can use. When both digital natives and digital immigrants know the technologies that appeal to the characteristics of each group, they can make informed technology selections. These informed technology selections cut down on the likelihood that technology is rejected, misused, or underused (Bai & Ertmer, 2008).

As outlined in Figure 3, there are technology tools that appeal to digital immigrants over digital natives, and vice versa. Aspects such as the user-friendliness, features, and navigation contribute to the placement of each technology tool in the figure. Depending on the circumstances and needs in the classroom (i.e., file sharing, video, presentation, writing, evaluation, classroom management, brainstorming, student products, and assessment) making an informed selection of technology may directly impact the effectiveness of the teachings. Below, several technology tools in the areas of video, presentation, and classroom management that appeal to digital immigrants or digital natives are outlined.

Figure 3: Tech Tools that Appeal to Digital Immigrants and Digital Natives

Tech Tools that Appeal to Digital Immigrants

Videos are often used in the K-12 classroom as a means of engagement. Digital immigrants can use YouTube (www.youtube.com) for videos in and out of the classroom. Working much like Google, a search engine many digital immigrants are comfortable using, YouTube allows educators to access video material posted by others. The familiarity of the platform to a search engine allows for digital immigrants to use YouTube without much assistance or guidance.

The presentation of material is a distinctive aspect of the K-12 classroom. Microsoft Office provides software that is commonplace in the classroom, including Microsoft Word for word processing and Microsoft Excel for data collection and/or analysis. Microsoft PowerPoint is also commonplace in the classroom for creating and giving presentations. The mass use and acceptance

of the software as a presentation tool and common features between all Microsoft products allows for digital immigrants to use Microsoft PowerPoint without much scaffolding.

Classroom management plays a huge role in the K-12 classroom. Digital immigrants can use Bouncy Balls (www.bouncyballs.org) for classroom management, specifically volume control. Using the microphone on any device, Bouncy Balls works to measure the volume in the classroom. Displayed on the screen of the device (or projector) is a set of bouncy balls that move faster with more noise and slower as the noise lessens. The simplicity of the platform allows for digital immigrants to use Bouncy Balls without much training.

Tech Tools that Appeal to Digital Natives

When it comes to using videos in the classroom, digital natives can use EDpuzzle (www.edpuzzle.com). Similar to YouTube, EDpuzzle works as a search engine for digital video content, but searches multiple platforms (e.g., YouTube, TED Talks, Kahn Academy, National Geographic, etc.). In addition to accessing video content, individuals can embed comprehension questions right into a video. The ability to embed questions into EDpuzzle videos allows for videos to be assigned, allowing for digital natives to be assessed in a manner that may be more comfortable to them.

When it comes to presenting material to 21st century learners, Pear Deck (www.peardeck.com) provides an alternative to Microsoft PowerPoint. Rather than a one-way presentation of information, Pear Deck allows for digital natives to interact with the material, instructor, and peers. The ability for interaction through multiple choice slides, drawing slides, draggable slides, text and number response slides, and web slides allows for digital natives to stay engaged in a lesson.

When it comes to classroom management, digital natives may respond will to Class Dojo (www.classdojo.com). After students to create avatars, Class Dojo allows an educator to assign points to positively reinforce good behavior and take away points to keep students focused and on task. Displayed on a classroom projector or students' individual devices (if available), digital natives can receive feedback on their participation in real time allowing them to modify their behavior if necessary. Although far more involved than Bouncy Balls, Class Dojo allows digital natives to respond to the real-time feedback they are accustomed to receiving in other aspects of life.

MINDSET

To further understand the perspectives of digital immigrants and digital natives, each of their respective mindsets will be discussed in detail. Mindset is defined as "the established set of attitudes held by someone" (Oxford Living Dictionaries, 2017). It is safe to assume that individuals who grew up prior to the digital age would have a different mindset towards technology than those who grew up during the digital age. Understanding the mindset of each group will allow both digital immigrants and digital natives to collaborate effectively within the K-12 classroom.

Mindset of Digital Immigrants

Within the K-12 classroom, digital immigrants may see technology as an "add-on" to their daily lesson plan. They may not view an app as being integrated into their curriculum and rather view it as something to use at the end of class, such as a short video clip. Additionally, as stated earlier, many digital immigrants prefer in-person interactions and may prioritize those over digital interactions. With the advancement of technology, such as the Internet, it may be possible for teachers to have their students complete a homework "check-in" online. However, some teachers may prefer to discuss the daily homework face-to-face as opposed to posting it on a website and having students confirm electronically when it is completed.

Two main mindsets that often occur with digital immigrants are that it is too difficult to learn new technology as well as it is too late for them to learn about new electronic devices, electronic educational programs, and apps. This was evidenced in Reid & Ostashewski (2011)'s study where a teacher who was unfamiliar with the iPad stated the following, "I don't have to be the guru of technology, my students will be" (p.1692). This mindset may pose a barrier for collaboration between digital immigrants and digital natives, where digital immigrants may feel hesitant to ask for assistance, and digital natives may be using the technology in a different manner than anticipated. For example, utilizing the iPads in school for social media as opposed to an educational app.

Mindset of Digital Natives

In contrast to digital immigrants, digital natives often view technology as being accessible to all and integrative into daily life. However, the definition of accessibility is often skewed among digital immigrants. Electronic device usage and technology may be ubiquitous among society; however, digital natives may not realize it is not accessible to all. Barriers to technology use may include lack of access and financial concerns. Furthermore, accessibility is a term often utilized among individuals who may require further supports, such as individuals with a physical or mental disability (Rust, 2015). Modifications to technology are available and examples for tablets and laptops include "adaptive hardware, touch screens, alternative keyboards and mice, and magnification and screen-reading software" are available to provide individuals with the ability to access the same technology with ease (Rust, 2015, para. 4). Within the K-12 classroom, there are teachers who may be considered digital natives and who may be unfamiliar with the types of modifications listed.

Digital natives will rely more on technology as a means to communicate which may pose an issue within the K-12 classroom. A digital immigrant teacher may find it difficult to discuss an issue with a digital native student, who is more comfortable speaking via text. The interpersonal skills that digital immigrants prefer, such as vocal tone, eye contact, and body language, are often not prioritized by digital natives. Consequently, there may be a communication gap between the two groups within a K-12 classroom.

CONCLUSION

The education and awareness provided within the article promote the conversation among technology use and communication between digital immigrants (often teachers) and digital natives (sometimes teachers, most often students) within the K-12 classroom. However, the question remains: how can we overcome the stigma and stereotypes associated with each group when it comes to using technology in the classroom? Within this conclusion, the authors will provide helpful strategies for both digital immigrants and digital natives.

The first suggestion is to choose your words carefully when interacting with digital immigrants or digital natives. Try to reduce stereotypes by making blatant assumptions. While the article highlights two different groups of individuals, the authors would like to acknowledge that it may be possible that there are outliers within each group, namely: there may be digital immigrants who are more comfortable with technology, and there may be digital natives who do not feel comfortable with the integration of technology.

The authors also encourage individuals to utilize a strengths-based lens and focus on the positive characteristics and abilities of both digital immigrants and natives. One example is if there are technical difficulties within the classroom. A digital immigrant is familiar with a time when SmartBoards, iPads, and computers were not readily available or used in the classroom. This individual could continue to teach a lesson even without wireless Internet – a feat which may be unheard of to a digital native.

On a similar note, supporting one another, whether you are a digital immigrant or digital native, is another recommendation. Provide assistance, answer questions, and above all listen to each other. This will help reduce barriers to communication and also foster collaboration and goodwill amongst staff and students.

The last suggestion is to utilize an inclusive perspective regarding the chosen technology in the K-12 classroom. As outlined in the Digital Natives Mindset section, technology is widespread; however, it may not fully meet the definition of accessible. Review the type of technology to be implemented to ensure that all students will be able to access it.

In conclusion, the integration of technology into everyday life has impacted the delivery of curriculum as well as educational expectations. The K-12 classroom may include both digital immigrants (mainly teachers) and digital natives (may encompass teachers and students). The article provides a comprehensive view of the characteristics and mindset of digital immigrants and digital natives. It also identifies commonly used technology by both groups as well as how each group can learn from one another. The article also provides suggestions for both digital immigrants and digital natives to foster awareness and promote collaboration and inclusivity within the K-12 classroom.

REFERENCES

Amresh, A., Carberry, A. R., & Femiani, J. (2013, October). Evaluating the effectiveness of flipped classrooms for teaching CS1. *In Frontiers in Education Conference, 2013 IEEE* (pp. 733-735). IEEE.

Bai, H., & Ertmer, P. (2008). Teacher educators' beliefs and technology uses as predictors of preservice teachers' beliefs and technology attitudes. *Journal of Technology and Teacher Education, 16*(1), 93–112.

Borsheim, C., Merritt, K., & Reed, D. (2008). Beyond technology for technology's sake: Advancing multiliteracies in the twenty-first century. *The Clearing House, 82*(2), 87–90.

Branscombe, A., Goswami, D., Schwartz, J., & Bowen, B. (1992). *Students teaching/teachers learning*. Heinemann.

D'Angelo, J., Woosley, S. (2007). Technology in the classroom: Friend or foe. *Education, 127*(4), 462–471.

Drago, E. (2015). The effect of technology on face-to-face communication. *The Elon Journal of Undergraduate Research in Communications, 6*(1), 13–19.

Ellis, Y., Daniels, B., & Jauregui, A. (2010). The effect of multitasking on the grade performance of business students. *Research in Higher Education Journal, 8,* 1–10.

English, J., & Gordon, D. (2004). Successful student remediation following repeated failures on the HESI exam. *Nurse Educator, 29*(6), 266–268.

Garrison, C., & Ehringhaus, M. (2009). *Formative and summative assessment in the classroom*. Association for Middle Level Education. Retrieved from http://schools.nyc.gov/NR/rdonlyres/33148188-6FB5-4593-A8DF-8EAB8CA002AA/0/2010_11_Formative_Summative_Assessment.pdf

Helsper, E. & Eynon, R. (2009). Digital natives: Where is the evidence? *British Educational Research Journal,* 1-18. doi: 10.1080/01411920902989227

Hembrooke, H., & Gay, G. (2003). The laptop and the lecture: The effects of multitasking in learning environments. *Journal of Computing in Higher Education, 15*(1), 46–64.

International Society for Technology in Education [ISTE]. (2017). ISTE standards for educators. Retrieved from http://www.iste.org/standards/for-educators

Johnson, T. J., & Kaye, B. K. (1998). Cruising is believing?: Comparing internet and traditional sources on media credibility measures. *Journalism and Mass Communication Quarterly, 75*(2), 325-340.

Li, Q. (2007). Student and teacher views about technology: A tale of two cities? *Journal of Research on Technology in Education, 39*(4), 377–397.

Mete, R., Riegel, C., Kozen, A., Polka W. (2017). What every contemporary teacher educator needs to know about technology...but, didn't know who to ask!. *Critical Issues in Teacher Education, 26*, 41–55.

National Education Association [NEA]. (2014). *Preparing 21st century students for a global society: An educator's guide to the "Four Cs"*. p. 1–38.

Netherton, D. L., & Deal, W. F. (2006). Assistive technology in the classroom. *Technology Teacher, 66*(1), 10-15.

Nickerson, R., & Zodhiates, P. (2013). *Technology in education: Looking toward 2020*. Routledge.

Oxford Living Dictionaries. (2017). Mindset. Retrieved from https://en.oxforddictionaries.com/definition/mindset

Prenksy, M. (2001). Digital natives, digital immigrants. *On the Horizon, 9*(5), 1–6.

Mete, R., Riegel, C., Kozen, A., Polka W. (2017). What every contemporary teacher educator needs to know about technology...but, didn't know who to ask!. *Critical Issues in Teacher Education, 26*, 41–55.

Reid, D., & Ostashewski, N. (2011, June). iPads in the Classroom–New Technologies, Old Issues: Are they worth the effort? In *EdMedia: World Conference on Educational Media and Technology* (pp. 1689-1694). Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

Rust, E. (2015, June 29). *How the internet still fails disabled people. The Guardian*. Retrieved from https://www.theguardian.com/technology/2015/jun/29/disabled-people-internet-extra-costs-commission-scope

Selwyn, N. (2010). Looking beyond learning: Notes towards the critical study of educational technology. *Journal of Computer Assisted Learning, 26*(1), 65–73.

Unicheck. (2015). *Digital immigrants vs digital natives: Closing the gap*. Retrieved from https://unicheck.com/blog/digital-immigrants-vs-digital-natives

Williams, D. L., Crittenden, V. L., Keo, T., & McCarty, P. (2012). The use of social media: an exploratory study of usage among digital natives. *Journal of Public Affairs, 12*(2), 127-136.

PLANNING FOR IMPROVEMENTS IN BOYS' ACADEMIC PERFORMANCE: TOWARD A BETTER UNDERSTANDING OF TEACHER-STUDENT RELATIONSHIP

CANUTE THOMPSON
University of the West Indies

ABSTRACT

This article explores the quality of teacher-student relationship as it relates to the academic performance of Jamaican male high school students when compared to their female counterparts. The study examined data from a regional examination body and found that girls out-performed boys in all subjects in the period 2011–2016. In extracting data from another study, it was found that boys had less positive perceptions of their relationships with their principals and teachers than girls. This article points to the need for educational practitioners and policy makers to adopt new ways of engaging boys in the teaching and learning process. Attention needs to be paid to the emotional and interpersonal needs of boys.

INTRODUCTION

The problem of male under-achievement, male under-representation, and comparatively lower academic performance is a global one. A March 6, 2015 article in the *Economist* magazine posed the question "Why do girls do better at schools than boys?" The authors contend that for centuries, boys have been doing better than girls but this situation is now changing. The article cites a study by the Organization for Economic Cooperation and Development (OECD) which examined how 15-year-old boys and girls performed at reading, mathematics, and science. The OECD study found that while boys still score somewhat better at mathematics and science the genders are roughly equal; but when it comes to the students who really struggle, the study found that boys are 50% more likely than girls to fall short of basic standards in all three areas.

Kohn (2002) articulates the issue with appropriate emotion when he writes:

> Remember when girls became nurses and not doctors; stenographers, not CEOs; teachers, not principals? Well, that's not the way it is any more. Thirty years after the passage of equal opportunity laws, girls are graduating from high school and college and going into professions and businesses in record numbers. Now, it's the boys who could use a little help in school, where they're falling behind their female counterparts.

Both the findings of the OECD study and the musings of Kohn reflect concerns that have been felt by policy makers, educational practitioners, and parents in Jamaica for decades. The results of the Caribbean Secondary Examinations Certificate (CSEC) have shown, over several years that girls do better than boys in most subjects. Using the data for the period 2011–2016, the findings show that girls outperformed boys in all five subjects analyzed.

The issue of male underperformance has several implications, the most important of which is the risk of declining male participation in organized, formal society. While it is accepted that participation in formal organizations is not the only, or indeed the primary, indicator of male participation in the society and economy, the increasing absence of males from the formal centers of society has raised concerns for policy makers and national leaders. Taking account of this problem, Jamaica and other Caribbean countries launched a Caribbean project in 2013 designed to address educational underachievement among boys. The programme which was named 'Advancing the Education of Boys', was designed to improve the educational outcomes of boys. Commenting

on the programme, which was funded by the Commonwealth Secretariat, a spokesperson for the Secretariat was quoted in the *Jamaica Observer* newspaper of June 6, 2013 as saying:

> We understand the gravity of the problem when it comes to the achievement of our boys and, in as much as it is an educational problem, we are also aware of the wider impact it has on society and socio-economic development.

The Government of Jamaica has remained focused on the problem of male underachievement, and in 2015 the Ministry of Education commenced training of some forty (40) trainers who would in turn train classroom teachers in the differences in how boys and girls learn and the strategies that can be implemented to close the gender achievement gap. This decision, according to the Jamaica Information Service, the government's information service, was followed by the Ministry's participation in a boys' learning conference hosted by the Gurian Institute in Denver, Colorado. Commenting on the importance of the initiative. National Numeracy Coordinator, Andre Hill, pointed to the scientific data on the differences in the brain function and anatomy of boys and its impact on the way they learn in the classroom, compared to girls.

There is emerging consensus that part of the explanation for boys underperformance, when compared to girls, lies in the area of physiology and biology. While accepting that physiology and biology may be important factors, there is research evidence suggesting that there are other important factors. This study seeks to explore some of those other factors.

STATEMENT OF THE PROBLEM

The academic underperformance of boys is a potential threat to society. It means that fewer and fewer males will be competent and available to assume leadership positions. The concern here is not that society needs males more than it needs females to fulfill leadership roles but that they are needed in equal proportion. Hoff Sommers (2013), author of *The war against boys*, commented on the manifestation of the phenomenon in the United States of America. She pointed out that the society needs to acknowledge that boys are languishing while girls are succeeding. She noted that as the world moves to being a knowledge economy in which school achievement becomes the cornerstone of lifelong success, women are adapting and men are not. According to Hoff Sommers, women in the United States now earn 62% of the associate degrees, 57% of the bachelor's degrees, and 60% of the master's degrees. Policy-makers and college administrators have been caught napping she laments.

The situation in the Caribbean is similar to that of the United States. Over the last two and a half decades, male participation in education has shown a decline. In 1982 the ratio of male graduates to female graduates from the Mona Campus of the University of the West Indies was 8:2. By the end of 1992 the situation had been reversed with 70% graduates from the Mona campus of the University of the West Indies being female. That pattern had been maintained in the twenty-five years (roughly a generation) since the reversal. A similar pattern obtains at the other campuses of the University of the West Indies, located in Barbados and Trinidad, as well as the Open Campus.

The 2012–2013 Education Statistics Report published by Jamaica's Ministry of Education (2015), shows that males accounted for just over one third (37%) of the 8,383 students enrolled in Community Colleges. The data with respect to Teachers' Colleges was more dismal with males accounting for only 18% of the 7,141 students enrolled that year. The situation across the university level was less discouraging when compared to Teachers' Colleges, which showed that of the 10,805 Jamaican students enrolled in undergraduate programmes at the three main campuses of the University of the West Indies, males accounted for 32%. At the post-graduate level, the picture was almost the same with males accounting for 30.5% of the 2,811 Jamaican students enrolled across the three campuses.

The 2014/15 Education Statistics report provided by the Ministry of Education shows a slight decline among male registration among males which was at 33.5% of the 8,405 students registered. This lower number of male registrants amounts to a decline of 877 male students when the 2012/13 report is compared with the 2014/15 report. There was a slight improvement at the Teachers' College level with males accounting for 19.5% of the students, compared to 18% in 2012, but the nominal figure was almost 100 fewer male students with the number in 2012 being 1,290 compared to 1,197 in 2014. At the university level, the figures in 2014 were roughly the same as 2012, with males accounting for 31.75% and a net increase of 427, in 2014.

The situation at the University of Technology shows a slightly better picture with 41.5% of 13,016 students being males according to the 2011/12 data. The overall picture, however, is one of diminished (or minority) male presence when it is considered that across the other approximately twenty-five private tertiary institutions reported on in the Ministry of Education statistics, males account for an average of 33%. Thus while there has been some fluctuation in the data, and one exception with the University of Technology, the dominant trend in the data is that males account for less than 20% of the student population at Teachers' Colleges and an average of about 33% across all, but one, of the other tertiary institutions.

Thus, there is no disputing that there is a major disparity in the educational performance gap between males and females and, as has been shown, the problem is not limited to Jamaica, given that a number of Caribbean countries. But the issue of educational gender gap is not merely a Caribbean problem. It is a global one. A report in the *Independent* Newspaper in August 2016 revealed that in the United Kingdom 94,000 more girls than boys applied for university places. There is thus a growing consensus that if this trend continues male participation in education and formal organizations in the public and private sector could fall to unimaginably low levels.

OBJECTIVES OF THE STUDY

The argument of this paper is that the decreasing presence of males in the workforce is a problem that is in part perhaps attributable to the school system. This paper therefore seeks to examine those dynamics of the school system which may be, at least in part, responsible for the academic performance of boys versus girls and thus the threat to male participation in public life which their underperformance portends.

Various initiatives were undertaken in Jamaica, dating back over the last forty years to address the issue of women's disempowerment which resulted from and was manifested in the dominance of males in academia and the workplace, of which the university graduation rates, cited above, was one manifestation. These initiatives included the establishment of the Centre for Women Development Studies (recently renamed the Centre for Gender Development Studies) at the University of the West Indies, the Women's Centre which catered to girls who became pregnant while in school, the Women's Outreach, and Resource Centre, and more recently the 51% Coalition. Each of these initiatives was intended to reduce the imbalance between the genders in respect to participation in the socio-economic life and power-sharing. Now that the pendulum appears to have swung the other way, a similar set of initiatives is needed.

The study has two main objectives, namely:

(i) To examine the academic performance of boys compared to that of girls. (The major high school terminal examination is used as the focal point of the comparison and data for the period 2011–2016 are used);

(ii) To explore whether the relationships between teachers and students are implicated in the performance of boys.

RESEARCH QUESTIONS

This paper seeks to answer two questions, namely:

(1) How does the performance of boys compare to that of girls in five selected subjects in Jamica's major high school terminal examinations?

(2) What are boys' perceptions of the quality of their relationships with their principals and teachers as compared to the girls' perceptions?

SCOPE AND SIGNIFICANCE OF THE STUDY

The study focused on the CSEC results of students in Jamaican public high schools 2011–2016. The study also examined the perspectives of one hundred and sixty grades ten and eleven students who participated in a survey that sought to understand students' perceptions and expectations of their principals and teachers. Both sets of data provided a broad perspective on the overall contextual realities of students' performance and their perceptions of their relationships with the school system.

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

a) It calls for public attention to a current and pressing social phenomenon which has major implications for the future of Jamaican and, indeed, Caribbean society;

b) It focuses the spotlight in a new way on the dynamics of the leadership practices and teacher-student relationships in schools.

LITERATURE REVIEW

A number of theories and perspectives have been advanced seeking to explain male under-performance. One of the dominant Caribbean perspectives surrounds the issue of male marginalization.

Male Marginalization

Figueroa (2004) defines male marginalization as representing a decline of the male relative to female in academic performance. In Jamaica, while the performance of boys and girls are roughly similar at the Grade Six Achievement Test (GSAT) levels, as students progress through the education system the academic gap between the genders widens in favour of girls. This widening gap then places boys at the fringes as girls come to dominate most areas of activity, up to and including the tertiary level.

Various explanations have been advanced for the differences between the academic performance of boys versus girls. These explanations cite power, socialization, temperament, genes, social forces such as social upbringing and subtle attempts at control, and brain-wiring. Miller (1991) contends that the performance of boys is attributable to male marginalization. He further argued that male marginalization emerged as a tool of social control. This method of social control was a result of efforts by those who held central positions of power in post-colonial society to restrict black men to occupations related to agricultural and industrial labour, in order to stifle the emergence of black militant men who could challenge the inequality and injustice in society. Miller thus advances what he calls a theory of place and laments what he describes as the use of women as weapons against men who, as a result of the gender war have been somewhat displaced. Miller's theory of place is in part supported by Hoff Sommers (2013) who asserts that across all ethnic groups boys experience far less connection in school, and earn less good grades, and display lower academic aspirations than girls. This lack of connection is synonymous to marginalization.

Barrow (1998) and Chevannes (1999) reject the idea that boys are marginalized. Barrow contends that Caribbean men are central to the family and suggested that Caribbean men show strong bonds to their mothers and assume care responsibilities on behalf of the family. In addition, they often share in the care of their siblings and, to a lesser extent, their nieces, and nephews. Chevannes insists that the under-representation of men in academia is compensated for by their dominance in the church, national politics, student power at the university, and also the upper echelons of academia. Despite Barrow's and Chevannes' disputation, the data on gender participation in academia and other areas of public life have been showing a trend towards greater female presence since the mid 1990's.

Biology and Physiology

Another explanation advanced for male under-performance is located in biology and physiology. Moul, et al (2013), found that the serum serotonin level in boys was a significant predictor of callous-unemotional traits. Serotonin exists in much high levels in boys than in girls and according to experts it is implicated in conditions such as Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD) which are more prevalent among boys than girls. According to Moul, et al, these disorders are manifested in behaviours such as spitefulness, arguing with adults, aggression towards others, destruction of property, and violation of rules. Thus, the degree to which these behaviours are prevalent among boys becomes a factor impacting academic work given the amount of energy that they utilize in distractive conduct.

Walker (2016) cites the work of Lusher and Yesenov who suggest that the differences in the performance of girls versus boys are attributable to the time at which school starts. In an experimental study conducted in an Eastern European country they found that by starting school later in the day the performance of boys improved and thus they concluded that one major explanation for the superior performance of girls is that they are early risers.

Walker also notes that the differences in the brain construction of boys versus girls are manifested in the reading habits of each gender. Citing the work of Lusher and Yesenov, he notes that girls read more than boys. Reading proficiency, they argue, is the basis upon which all other learning is built, thus when boys refuse to take a deep interest in reading the other areas of their academic performance suffer as well. Lusher and Yesenov further found that girls spend more time on homework and that boys are more adversely affected by peer pressure than girls and these factors impact their focus on and dedication towards their school work. These factors in turn affect the quality of boys' relationship with their teachers. Walker, Lusher and Yesenov contend that when boys are badly behaved (due to peer influence) teachers mark them down for this. Lusher and Yesenov point to confirmatory evidence in support of their contention that relationships with teachers play a role in boys' assessed performance. They cited reports that on anonymous tests boys perform better and that the gender gap was minimized when teachers do not know the gender of the pupil whose work they are marking.

Teacher-Student Relationships

Hughes and Kwok (2007) in a compelling study conducted in Texas, sought to examine the influence of student-teacher and parent-teacher relationships on student achievement in the primary grades. The study involved 443 ethnically diverse 1st graders, of whom were 52.6% males and 47.4% females. The study found that the quality of teachers' relationships with students and their parents served to correct and counterbalance the traditional adverse effects that normally arise in relation to children's background and classroom engagement. The study further found that the

quality of child classroom engagement served to inform the quality of student–teacher and parent–teacher relatedness and child achievement the following year.

A further feature of the research findings was striking. The study found that the improved student-teacher and parent-teacher relationships were stronger among African American children and their parents, relative to Hispanic and Caucasian children and their parents. In effect, what the study showed was that the need for relatedness being greater among African Americans had a greater impact on their academic achievement.

Hughes and Kwok's note of students' sense of social relatedness at school is a key construct in contemporary theories of academic motivation and engagement (Connell & Wellborn, 1991; Eccles, Wigfield, & Schiefele, 1998). Hughes and Kwok concluded that when students experience a sense of belonging at school and supportive relationships with teachers and classmates, they are motivated to participate actively and appropriately in the life of the classroom, and that when deep relatedness is established in the early grades it supports academic motivation and achievement over the long term. Similar findings were supported by authors in subsequent years (Hamre & Pianta, 2001; Ladd, Birch, & Buhs, 1999 as cited in Hughes & Kwok, 2007).

THEORETICAL FRAMEWORK

Four theoretical frameworks have informed this study. The first is that of Lusher and Yesenov (2016) who argue that teachers' negative attitude towards boys and their biased engaged with them based on gender stereotypes affects their assessment of boys' academic performance.

The second work which informs this study is that of Barriteau (2000) who argues that gender systems in the Caribbean consist of two main areas namely material and ideological relations. According to Barriteau, material dimensions explain how men versus women are allocated or given access to material and non-material resources within the state and society, while ideological dimensions explain how Caribbean society construct beliefs about masculinity and femininity. Barriteau's perspective is somewhat supported by Figueroa (2004) who suggests that differences in role expectations somehow lower the performance bar for boys, thus there is the societal expression that "boys will be boys", which means that boys are expected to misbehave while girls are expected to conform to a rigid code. Thus, when a boy does well academically it is viewed with surprise and applause but it is expected that a girl will do well. This framework of differential expectations and negative attitudes towards boys is what employed in this study to explore the key question that informs this research.

The third theoretical lens through which this study is pursued is found in the work of Monarth (2014) who speaks to the issue of power. Citing research conducted by Yona Kifer of the University of Tel Aviv, Monarth argues that when employees are enabled to feel powerful, the feeling can boost productivity and improvements in performance, thus leaving employees feeling more satisfied on the job. Thus, this study is predicated on the view that the degree of power that boys perceive they have or are facilitated in having, is a major explanation for how well they perform and how confident they are.

The final theoretical framework that informs this study is the issue of the role of relationships between teachers and students. Hughes and Kwok (2007) whose study, conducted in Texas, USA, sought to examine the influence of student-teacher and parent-teacher relationships on student achievement in the primary grades. The study found that the quality of teachers' relationships with students and their parents served to correct and counterbalance the traditional adverse effects that normally arise in relation to children's background and classroom engagement.

RESEARCH METHODOLOGY

Research Design

This study uses an exploratory design. According to Cuthill (2002) and Creswell (2005), exploratory designs are used when there is little or nothing known about a problem and thus there is a need to acquire greater knowledge of details and concerns, generate new ideas and assumptions, and make a determination about whether a study is feasible in the future.

Sample

This study used two sets of samples. The first is the results of students' examination grades in the Caribbean Examination Certificate over the period 2011–2016. The purpose of using this sample was to explore the performance of boys versus girls drawn from across the Caribbean. The number of girls who enter for these examinations is higher than the number of boys. It would not be feasible to create equal sample sizes for each gender. The sample used was the cohort of all students sitting the exams.

The performance of these students was assessed in five subjects, namely English Language, Mathematics, Chemistry, Information Technology, and Principles of Accounts. The subjects were purposively chosen to include four subjects that all students are mandated to sit (English Language, Mathematics, Accounts, and Information Technology) and four others.

The second sample consists of 160 Grades 10 and 11 students whose views and perspectives were canvassed in relation to a number of issues regarding their assessment of their teaching and learning environment. The views of these students were sought in order to determine whether there were differences between the boys' assessment of the learning environment and that of girls.

The sample consisted of:

(a) forty students from a rural all-boys traditional high school;
(b) forty students from an urban all-girls traditional high school;
(c) forty students from each of two co-ed non-traditional high schools.

'Traditional' schools refer to schools that offered a typical grammar school education based on the British system. These schools were established in Jamaica while the country was under British rule. Non-traditional schools are those that were constructed after independence and offered a wider range of subjects to include technical and vocational education. The 160 students were either from Grades 10 or 11 students randomly chosen by their teachers to participate in the research. The sample consisted of 54 % females and 46 % males.

Data Collection Instruments, Reliability, and Validity

The reports of the examinations that were published by the Caribbean Examinations Council (CXC) 2011-2016 were used to provide the data on students' performance, while a self-designed 44-item instrument was used to collect data on students' perspectives. The instrument was pilot- tested twice and modified based on pilot results. The instrument was then assessed by a panel of reviewers who deemed it to have adequately captured the key issues related to the proposed field of inquiry. The instrument was further tested for internal consistency using Cronbach's Alpha and it produced a score of .899. A C-Alpha score of roughly .9 meets the standards proposed by Nunnally (1978) who argues that a C-Alpha score of .9 and above suggests a high level of reliability. This view was shared by Drost (2011) and Rosenthal and Rosnow (1991). The instrument is included in this study as an Appendix.

Data Collection Procedures and Analysis

Student academic performance in the five subject areas (English Language, Mathematics, Chemistry, Information Technology, and Principles of Accounts) was indicated in the results of the Caribbean Secondary Examinations Certificate published by the Caribbean Examinations Council (CXC) in its reports of 2011-2016. For student perceptions, the researcher collected the data from each school in a sequential fashion, with two schools being targeted each week. In two schools (the non-traditional schools) a teacher who was assigned by the principal to support the research process administered the questionnaire and in the other two the researcher administered the questionnaire to the group of assembled students. In all four schools, the questionnaires were administered and completed in a single sitting. The data from the questionnaires were analyzed using the Statistical Package for Social Sciences (SPSS).

RESULTS

Performance of Boys versus Girls: 2011 – 2016

Tables 1 – 5 provide a summary of students' performance over the period 2011 – 2016 in five purposively selected subject areas. The overall picture shows that the performance of girls was superior to that of boys in all areas. The scores 1, 2, 3 indicate the level of passes with 1 being the equivalent of A, 2 the equivalent of B, and 3 the equivalent of C.

The tables indicate that girls account for as much as 67% in a given cohort but at all times well above 50%. Thus the fact that the number of boys who participated in the examinations was significantly less than that of girls is descriptive of the degree to which boys were under-represented in academic undertakings. This fact of under-representation is therefore compounded by lower performance.

Table 1 Performance in English Language[1]

Year	Total # of students sitting subject	# and % boys	# and % girls	% boys grade 1	% girls grade 1	% boys grade 2	% girls grade 2	% boys grade 3	% girls grade 3
2011	44571	17519 (39.31)	27052 (60.69)	3.54	9.99	6.87	13.36	10.27	17.04
2012	48335	19723 (40.81)	28612 (59.20)	2.25	5.73	4.09	7.98	8.71	15.54
2013	46315	19094 (41.23)	27221 (58.77)	3.08	7.82	6.03	10.69	10.18	16.69
2014	43860	18648 (42.52)	25212 (57.48)	4.02	10.21	6.48	10.67	9.81	15.31
2015	40981	17819 (43.48)	23162 (56.52)	4.17	10.35	6.15	10.62	10.30	14.72
2016	40662	17679 (43.48)	22983 (56.52)	4.89	11.93	7.68	11.96	11.28	15.63

[1]While English is the language of instruction, there is also an examination that is known as English Language in which students' competence in grammar, comprehension, creative writing, and reasoning, among other things, are tested.

Table 1 shows that in each year 2011 to 2016 the percentage of boys who received a score of 1 in English Language ranged from about a half of the percentage of girls with 2.25% in 2012, compared to 5.73% of girls. In 2016 when the percentage of boys receiving a score of 1 was at its highest in the six years studied, at 4.89%, the performance of girls was also at its highest, outstripping boys by just under two and a half times.

The comparative performance of boys versus girls in the area of Mathematics, as shown in Table 2, was not as contrastive as it was with English Language. In each year the percentage of girls getting a grade of 1 was less than double the percentage of boys. This statistic does not show that boys were performing better, it only showed that both were performing relatively poorly with boys performing more poorly than girls.

It is to be noted that in both English Language and Mathematics, while the percentage of boys who received Grades 2 and 3 was higher than that for Grade 1, the performance of girls was again superior but in all cases by less than double. What this suggests, among other things, is that more boys were represented in the lower grade level performances.

Table 2 *Performance in Mathematics*

Year	Total # of students sitting subject	# and % boys	# and % girls	% boys grade 1	% girls grade 1	% boys grade 2	% girls grade 2	% boys grade 3	% girls grade 3
2011	45741	17197 (37.60)	28544 (62.40)	1.73	2.83	3.40	5.09	6.71	10.97
2012	50551	19382 (38.34)	31169 (61.66)	1.65	3.01	3.03	4.80	6.33	10.70
2013	48631	19033 (39.14)	29598 (60.86)	1.71	2.56	3.41	5.07	7.46	11.96
2014	46085	18828 (40.86)	27257 (59.15)	3.12	4.34	5.48	7.27	10.31	15.38
2015	42374	17520 (41.35)	24854 (58.65)	4.66	7.35	6.80	9.67	10.02	14.97
2016	41973	17222 (41.03)	24751 (58.97)	3.43	5.27	4.14	5.67	8.61	11.60

Boys again underperformed in relation to girls in the area of the sciences. The subject chosen for this analysis was chemistry. The comparative levels of performance here was close to that of English with the percentage of girls receiving Grades 1, 2, and 3 sometimes doubling the percentage of boys as can be seen 2015 and 2016 for Grade 1. While it was only in those two of the six years analyzed that the performance of girls outstripped that of boys by a margin of 2:1, the margins in the other years were also fairly wide (See Table 3).

Table 3 *Performance in Chemistry*

Year	Total # of students sitting subject	# and % boys	# and % girls	% boys grade 1	% girls grade 1	% boys grade 2	% girls grade 2	% boys grade 3	% girls grade 3
2011	7175	2675 (37.28)	4500 (62.72)	2.96	4.50	5.67	9.83	12.24	20.15
2012	7534	2669 (35.43)	4865 (64.67)	3.64	5.34	5.35	9.80	9.66	17.75
2013	7590	2724 (35.89)	4866 (64.11)	2.36	4.53	6.09	10.53	11.70	20.78
2014	7571	2761 (36.47)	4810 (63.53)	5.09	6.95	7.54	12.17	10.59	20.29
2015	7310	2607 (35.66)	4703 (64.34)	2.27	4.79	5.31	9.23	10.60	19.04
2016	7294	2542 (34.85)	4752 (65.15)	3.32	6.94	4.80	8.73	8.87	15.25

It has been suggested that boys tend to learn better when working with their hands (Walker, 2016). Thus subjects such as Chemistry, as shown in Table 3, and Information Technology (Table 4) which involve practical work should be more appealing to boys and by extension they should perform better in these subjects. The data, however, show otherwise and the margin of difference between the performance of boys versus girls is roughly the same as in the reading subject of English Language and the reasoning subject of Mathematics.

Table 4 *Performance in Information Technology*

Year	Total # of students sitting subject	# and % boys	# and % girls	% boys grade 1	% girls grade 1	%boys grade 2	% girls grade 2	% boys grade 3	% girls grade 3
2011	15211	6464 (42.50)	8747 (57.50)	2.95	4.75	9.32	14.99	15.07	21.33
2012	15988	6915 (43.25)	9073 (56.75)	3.73	6.02	10.86	15.12	14.72	20.79
2013	15273	6555 (42.92)	8718 (57.08)	6.25	10.90	11.36	15.64	11.97	16.24
2014	15297	6773 (44.28)	8524 (55.72)	5.70	7.90	11.00	14.78	13.85	18.46
2015	15249	6707 (43.98)	8542 (56.02)	9.10	14.91	12.95	17.70	10.66	12.40
2016	14499	6415 (44.24)	8084 (55.76)	3.76	7.75	9.44	14.25	14.17	17.62

In the subject of accounting the picture is very similar to that of English Language in which the performance of girls, measured in terms of the percentage who received higher grades, exceeded that of boys by margins of 2:1 or higher. In almost every year examined and across all three pass levels, the performance of girls was above the 2:1 margin with some near 3:1 (See Table 5).

As has been shown, girls are not congenitally superior to boys. The contrasts in their level of performance exist in subjects that require intense scrutiny.

Table 5 *Performance in Principles of Accounting*

Year	Total # of students sitting subject	# and % boys	# and % girls	% boys grade 1	% girls grade 1	% boys grade 2	% girls grade 2	% boys grade 3	% girls grade 3
2011	11478	3812 (33.21)	7666 (67.79)	3.79	9.54	5.78	13.83	9.37	19.03
2012	11375	3875 (34.07)	7500 (65.93)	2.15	5.62	3.68	9.81	9.11	19.33
2013	10360	3506 (33.84)	6854 (66.16)	4.83	13.77	6.77	14.86	9.64	18.03
2014	9748	3428 (35.17)	6320 (64.83)	3.74	9.60	5.75	12.61	10.45	20.21
2015	9110	3231 (35.47)	5879 (64.53)	4.22	10.48	5.98	13.37	9.42	17.18
2016	8856	3109 (35.11)	5747 (64.89)	2.90	7.81	5.54	12.11	10.01	21.24

Boys' perceptions of the quality of their relationships with their principals and teachers

The second question sought to inquire into the perceptions that boys had of their relationships with their teachers compared with the perceptions that girls had of their relationships with their teachers. In doing this inquiry, the students in our sample were asked to state whether they agreed or disagreed with a number of assertions in the survey.

Based on a sample which consisted of 54 % girls and 46 % boys, the study found, as shown in Table 6, that with the exception of two variables namely: 'my teacher encourages my self-confidence' and 'feeling of being prepared for life after school', girls had more positive assessments of their relationships with their teachers than did boys.

In relation to the variable 'principals' interest in students' concerns', 75% of girls agreed that their principal showed interest in their concerns compared to 50% boys. The contrast is significant wherein 39% of boys disagree compared to 9% girls – a margin of almost 5:1. On the question of involvement in decision-making the margin of girls agreeing that their principal involves them in decision-making was almost twice of that of boys with 65% of girls agreeing compared to 34% of boys. Again the contrast is significant with a 6:1 margin to the disfavor of boys with 43% disagreeing that their principal involves them in decision-making compared to 7% of girls. (The words 'principal' and 'teacher' are used interchangeably in this paper except where the context specifically makes a distinction. For all intents and purposes, a principal is a teacher who manages a school and supervises other teachers).

Table 6 *Percentages of Boys versus Girls in relation to Selected Variables*

Variable	% of Girls Agreeing or Strongly Agreeing	% of Boys Agreeing or Strongly Agreeing	% of Girls Disagreeing or Strongly Disagreeing	% of Boys Disagreeing or Strongly Disagreeing
* Principals' interest in students' concerns	75	50	9	39
* Principal involves students in decision-making	65	34	7	43
* Principal takes an interest in students who are underperforming	66	50	4.5	28
* Principal is comfortable with expressions of disagreement	52	37	29.5	44
* My teacher encourages my self-confidence	84	86	8	5
* Feeling of being prepared for life after school	75	86.5		

DISCUSSION

The data show that between 2011 and 2016, girls outperformed boys in all five subjects of the CSEC examinations surveyed. The academic performance of girls versus boys, is a function of a number of variables whether physiological as Moul, et al (2013) suggests, ideological, as Barriteau (2000) contends, or political as Miller (1991) has argued.

Taking account of the various explanations, it seems to be the case that the most compelling set of findings that explain the performance of boys versus girls are relational as Hughes and Kwok (2007), Barrow (2015), and Lusher and Yesenov (2016) have found. This current study found some telling contrasts between boys' perceptions of their relationships with their principals and teachers, versus those of girls. The nature of these contrasts constitutes a major explanation for the performance of boys versus girls.

The first area examined was students' perceptions of their principals' interest in their concerns. The study found that whereas 75% of girls agreed or strongly agreed that their principals showed interest in their concerns, only 50% of boys did. The opposite end of the scale was even more telling with a mere 9% of girls disagreeing or strongly disagreeing compared to 39% of boys.

The important area of empowerment also showed significant differences between the perceptions of the genders. Feelings of empowerment or lack of empowerment are among the most critical senses that inform self-assessments of whether one feels excluded or included, marginalized or mainstreamed. In his research on employees, Monarth (2014) argued that when employees were enabled to feel powerful, the feeling could boost productivity and improvements in performance, thus leaving employees feeling more satisfied on the job. In this study, while 65% of girls agreed or strongly agreed that their principals included them in decision-making, only 34% of boys held that opinion. The picture at the other end of the scale was as stunning as it was in relation to perceptions of concerns being taken into account, with only 7% of girls disagreeing or strongly disagreeing that their principals included them in decision-making compared to a whopping 43% boys, over six times the percentage of girls.

The area of academic performance presented what may be described as distressing contrasts regarding the fact that academic performance is one of the key places from which the problem of marginalization originates and one of the most frequently referenced measures of marginalization. This issue of performance is contrastively viewed by Miller (1991), on the one hand, and Barrow (1998) and Chevannes (1999) on the other. Miller contends that males underperform because of their perceived place, but Barrow and Chevannes insist that men have more centres of power than mere academic performance or participation on public life.

The study found that only 4.5% of girls disagreed or strongly disagreed that their principals showed a caring attitude towards underperforming students, compared to 28% of boys who shared the perspective. The gap between the genders in respect of agreeing or strongly agreeing was not as wide with sixteen percentage points separating the genders – 50% boys and 66% girls. This comparatively narrow gap is explained by the size of the 'unsure' with 22% and 28% respectively being unsure. These finding tends to support the views of Miller (1991).

In relation to the other dimension of empowerment, namely having a voice and expressing disagreement, the percentage differentials between the genders while not being as wide, when compared to other areas, were nonetheless significant with 52% of girls agreeing or strongly agreeing that their principals are comfortable with them expressing disagreement compared to 37% of boys. The fifteen-percentage point spread is similar to that at the other end of the scale with 44% of boys disagreeing or strongly disagreeing that their principals are comfortable with them expressing disagreement compared to 29.5% of girls.

There were two findings in relation to students' perceptions of their relationship with their teachers and, interestingly, the contrasts between the perceptions of boys versus girls were not as wide as those when their perceptions of their relationship with their principals were measured. In fact, in relation to the first variable examined, namely students' perceptions of whether their teachers encouraged their self-confidence both genders were neck-and-neck with 86% boys and 84% girls agreeing or strongly agreeing that their teachers encouraged their self-confidence. Three percent of boys and seven percent of girls either disagreed or strongly disagreed. In this and the other variable tested fewer boys had a negative perception although the percentages are small. In relation to the other variable, perceptions of being prepared for life after school, 8% of girls disagreed or strongly disagreed that they are being adequately prepared compared to 5% of boys. The percentage of boys who agree or strongly agree that they were being prepared exceeded that of girls by eleven and a half percentage points at 86.5% compared to 75%.

It is somewhat ironic that while boys had generally less favourable views of their principals and teachers they reported feeling more prepared for life after school. This finding may explain the decrease in the number of males pursuing tertiary education and opting instead to go into entrepreneurial ventures. This interesting finding is worthy of further study.

CONCLUSION

There is overwhelming evidence that the quality of relationships that students share with their principals and teachers affect students' academic performance. The academic performance of boys in Jamaican High Schools, which is evidenced most clearly in the CSEC examination results, has been consistently weak when compared with that of girls using data for the period 2011–2016. Alongside the weaker academic performance is the fact that among a sample of 160 students surveyed boys expressed adverse opinions about the quality of their relationships with their principals across all four variables that related to their principal specifically though their perceptions were on par with that of girls in respect of one variable that specified their teacher.

It may be concluded that the path to improving boys' academic performance lies along the road of providing a more caring, inclusive, supportive, and male friendly learning environment for boys. Such an environment will require that teachers and principals share with boys in intellectually more stimulating and friendly ways, treating them in ways that make them feel related and connected. Boys will place greater value on their educational responsibilities when they share meaningful relationships with their schools' academic leaders.

IMPLICATIONS FOR EDUCATIONAL PLANNING

The disparities in the positive experiences and perceptions that boys have of the education system in Jamaica and the academic performance of boys across the Caribbean, including Jamaica, raise important questions for educational planners and policy makers. The first and most fundamental question is whether the education system is skewed, by design or accidental /unintended custom, against boys. Whichever it is, the trajectory of this trend is so serious that there is need for a radical overhaul of the education system in order to address the factors identified by boys which reflect their negative experiences. These include issues of inclusive pedagogy, the processes of decision-making, the level of attention paid to the needs of boys, as well as the provision of resources to support the effective delivery of a wider range of learning options that are responsive to the needs of boys.

Addressing the problem of the underperformance of boys also requires that governments of the region engage the expertise of educational planners and other professionals in countries in which

the disparity in the performance of boys is not as stark as it is in the Caribbean. Given, however, that the problem of male underperformance is a global one, as shown in the literature, one of the directions in which the planning process must go is that of greater collaboration among countries and regions of the world to explore and share practices that have been found to work, or are working, in tackling boys' academic underperformance.

RECOMMENDATIONS

For School Administrators and Teachers

Given the evidence that boys perceive themselves to be less close to their teachers than girls do and given the consistent weaker academic performance of boys compared to girls, it is recommended that:

(1) Educational practitioners take cognizance of the existence of the perception that boys feel less positively about the quality of their relationship with them than do girls and adjust their pedagogical approaches to ensure that actual or potential inequities are removed;

(2) Decision-making processes and practices at schools need to be re-examined to make them more inclusive and take account of the ways in which boys seek to engage.

For Policymakers

Having regard to what other research has shown about how boys learn, it is recommended that:

(3) Subject offerings and components of courses be re-visited to ensure that greater emphasis is placed on practical and applied learning;

For Educational Planners

Having regard to the need to ensure that the disparities in the performance and positive experiences of boys versus girls, it is recommended that:

(4) Countries of the Caribbean engage in greater collaborative efforts with countries outside to region to explore and draw on successful practices that have been, and are being used, to address the problem of male under-representation and under-performance in school and colleges.

(5) The educational planning processes of countries, both at the sector and institutional levels, design systems that ensure equitable representation of boys at all levels of decision-making and other forms of power-sharing, as well as in the provision of additional resources to support their performance.

FOR FURTHER RESEARCH

Based on research findings from other jurisdictions regarding the relationship between time of day and how well boys learn, it is recommended that:

(6) Research be done to determine whether factors such as time of day and normal sleeping and waking hours are related to how well boys in tropical climates learn.

Having regard to the fact that boys report feeling more prepared for life after school, despite having generally less favorable views about their relationships with their principals and teachers, it is recommended that:

(7) Further study be done on boys' self-perception and values-orientation to better understand what makes boys tick and that the findings of these studies be used to inform investment and policy directions in planning for boys educational and career needs.

REFERENCES

Barriteau, V. E. (2000). Feminist theory and development: Implications for policy, research, and action. In J. L. Parpart, M. P. Connelly, & V. E. Barriteau (Eds.), *Theoretical perspectives on gender and development*. Ottawa: International Development Research Council. p. 161–178.

Barrow, C. (1998). Caribbean gender ideologies: Introduction and overview. In C. Barrow (Ed.), *Caribbean portraits: Essays on gender ideologies and identities*. Kingston, Jamaica: Ian Randle Publishers, pp. xi–xxxviii.

Barrow, R. (2015). Giving teaching back to teachers: A critical introduction to curriculum theory. London: Routledge.

Chevannes, A. B. (1999). *What we sow and what we reap: Problems in the cultivation of male identity in Jamaica. Kingston, Jamaica*: Grace, Kennedy Foundation.

Connell, J. P., & Wellborn, J. G. (1991). Competence, autonomy, and relatedness: A motivational analysis of self-system processes. In M. R. Gunnar & L. A. Sroufe (Eds.), *Minnesota symposia on child psychology*, 23,43–77. Hillsdale: Lawrence Erlbaum.

Creswell, J. W. (2005). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Upper Saddle River, N.J: Merrill.

Cuthill, M. (2002). Exploratory research: Citizen participation, local government and sustainable development in Australia. *Sustainable Development,* 10, 79–89. doi: 10.1002/sd.185

Dennis, D. (2015). Teachers to be trained to improve the way boys learn. Retrieved from http://jis.gov.jm/teachers-to-be-trained-to-improve-the-way-boys-learn/

Drost, E. (2011). Validity and reliability in social science research. *Education Research and Perspectives*, 38(1), p. 105 – 124.

Eccles, J. S., Wigfield, A., & Schiefele, U. (1998). Motivation to succeed. Retrieved from http://www.unco.edu/cebs/psychology/kevinpugh/motivation_project/resources/eccles_wigfield_schiefele98.pdf

The Economist. (2015, March 6). Why girls do better at school than boys. Retrieved from https://www.economist.com/blogs/economist-explains/2015/03/economist-explains-3

Figueroa, M. (2004). Male privileging and male academic underperformance in Jamaica. In R. Reddock (Ed.), *Interrogating Caribbean masculinities: Theoretical and empirical analyses.* Kingston, Jamaica: The University of the West Indies Press, p.137–166.

Hamre, B. K., & Pianta, R. C. (2001). Early teacher–child relationships and the trajectory of children's school outcomes through eighth grade. *Child development,* 72(2), 625–638.

Hughes, J., & Kwok, O. M. (2007). Influence of student-teacher and parent-teacher relationships on lower achieving readers' engagement and achievement in the primary grades. *Journal of educational psychology*, 99(1), 39.

Kohn, A. (2002). The gender gap: Boys lagging. Retrieved from http://www.cbsnews.com/news/the-gender-gap-boys-lagging/

Ladd, G. W., Birch, S. H., & Buhs, E. S. (1999). Children's social and scholastic lives in kindergarten: Related spheres of influence? *Child development,* 70(6), 1373–1400.

Livingston, P. (2013). Jamaica directory of educational institutions 2012–2013. Kingston: Ministry of Education Statistics section planning and development division. Retrieved from http://moe.gov.jm/sites/default/files/Directory%202012.pdf

Miller, E. (Ed.). (1991). *Education and society in the Commonwealth Caribbean*. Institute of Social and Economic Research, The University of the West Indies.

Ministry of Education. (2015). *Education Statistics 2014–2015*. Kingston, Jamaica: Planning and Development Division.

Monarth, H. (2014, May). Make your team feel powerful. *Harvard Business Review*.

Moul, C., Dobson-Stone, C., Brennan, J., Hawes, D., & Dadds, M. (2013). An exploration of the serotonin system in antisocial boys with high levels of callous-unemotional traits. Retrieved from https://doi.org/10.1371/journal.pone.0056619

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.

Rosenthal, R., & Rosnow, R. L. (1991). *Essentials of behavioral research: Methods and data analysis* (2nd ed.). New York: McGraw-Hill.

Smith-Edwards, A. (2013, June 30). Jamaica leading project to address underachievement in boys. *Jamaica Observer*. Retrieved from http://www.jamaicaobserver.com/news/Jamaica-leading-project-to-address-underachievement-in-boys_14424128

Sommers, H. C. (2013). How to make school better for boys. *The Atlantic*. Retrieved from https://www.theatlantic.com/education/archive/2013/09/how-to-make-school-better-for-boys/279635/

Sommers, H. C. (2013). The war against boys: How misguided policies are harming our young men. New York: Simon & Schuster.

Walker, T. (2016, August 9). Girls do better than boys at school because they're morning people, study suggests. *Independent*. Retrieved from http://www.independent.co.uk/news/education/girls-do-better-than-boys-at-school-because-they-re-morning-people-study-suggests-a7181511.html

APPENDIX – QUESTIONNAIRE

STUDENTS' PERCEPTIONS AND EXPECTATIONS OF LEADERSHIP IN A POSTMODERN ERA

SECTION A

1. Gender:	**(a)** Male	[ ]	**(b)** Female	[ ]
2. Form:	**(a)** 4th	[ ]	**(b)** 5th	[ ]
3. Location of School:	**(a)** Urban	[ ]	**(b)** Rural	[ ]
4. Type of School:	**(a)** Traditional High	[ ]	**(b)** New Sec	[ ]

SECTION B - The following statements are about your views and experiences in your relationship with your teacher.

	SA	A	U	D	SD
1. My teacher shows interest in my opinions					
2. My teachers encourages students to hold points of views that may differ from his/her own					
3. My teacher responds positively when students disagree with him/her					
4. My teacher does not try to dictate what students should think					
5. I respect my teacher					
6. My teacher's teaching style contributes to my level of motivation					
7. My academic performance is influenced by my teacher's style of teaching					
8. I feel respected by my teacher					
9. I feel that my teacher makes an effort to make school work exciting					
10. I have a close relationship with my teacher					
11. My attitude towards others is influenced by my relationship with my teacher					
12. I believe I am being adequately prepared for life after school					
13. I am often commended by my teacher					
14. I listen to my teacher's advice					
15. I am a highly motivated student					
16. My teacher accepts that he/she is not always right in how an issue may viewed					
17. My teacher conveys to students that there may be more than one correct approach to a given situation					
18. My teacher knows his / her subject matter very well					
19. My teacher is a good role model					
20. My teacher encourages me to have confidence in myself					
21. My teacher likes to engage in debates with students					
22. My teacher is a good listener					
23. My teacher accepts correction from students					
24. My teacher makes learning applicable to real life issues					
25. My teacher encourages students to be tolerant of differing points of view					
26. At my school there is a strong emphasis on academic performance					

	SA	A	U	D	SD
27. At my school students are encouraged to develop and express their own points of view					
28. At my school teachers believe they can learn from students					
29. At my school it is viewed as a good thing when students try to get answers from teachers on the reasons for some of their decisions					
30. My principal takes a positive interest in students who are not performing to their best					
31. My principal takes an interest in the concerns of students					
32. My principal takes the views of students into consideration before making some decisions					
33. My principal shows respect to students					
34. I respect my principal					
35. My principal is a good role model					
36. My principal is a good leader					
37.My principal is a good listener					
38. My principal behaves as if he/she owns the school					
39. My principal encourages students to be critical thinkers					
40. I would feel comfortable expressing my opinions to my principal if I disagreed with something.					

INVITATION TO SUBMIT MANUSCRIPTS

The editor of *Educational Planning*, a refereed journal of educational planning issues, invites the submission of original manuscripts for publication consideration. *Educational Planning* is the official journal of the International Society for Educational Planning. The audience of the journal includes national and provincial/state planners, university faculty, school district administrators and planners, and other practitioners associated with educational planning.

The purpose of the publication is to serve as a meeting place for scholar-researcher and the practitioner-educator through the presentation of articles that have practical relevance to current issues and that broaden the knowledge base of the discipline. *Educational Planning* disseminates the results of pertinent educational research, presents contemporary ideas for consideration, and provides general information to assist subscribers with their professional responsibilities.

Manuscripts preferred for inclusion are those from practitioners, reports of empirical research, expository writings including analyses of topical problems, or case studies. Unsolicited manuscripts are welcomed.

The following criteria have been established for the submission of manuscripts.

STYLE: All formatting should adhere strictly to the current guidelines set in the Publication Manual of the American Psychological Association.

LENGTH: The manuscript, including all references, figures or illustrations, charts, and/or graphs, should not exceed 20 pages. In addition, an Abstract (between 150-500 words on a separate sheet of paper) describing the focus of the manuscript should be included at the beginning of the manuscript.

WORD PROCESSING: SINGLE-SPACE all text using TIMES NEW ROMAN with a 10 point type. Headings and sub-headings should be in ARIEL with a 10 point type. Provide 1.0 inch margins top and bottom, and 1.5 inch left and right, with 1.0 inch header and 1.0 inch footer. The body of the manuscript must be no wider than 5 ½ inches to fit the paper. Lengthily tables, drawings, and charts or graphs should be scaled to the dimensions given and should preferably be camera-ready.

FORM of SUBMISSION: Send the manuscript to the Editor electronically in Microsoft Word as an attachment to an email. The email address is: tchan@kennesaw.edu

The manuscript should include the following:

Title Page

Title of the manuscript
Date of Submission
Author(s) name, mailing address, telephone number, email address, and fax number
Biographical sketch not to exceed 75 words

Abstract

An abstract not to exceed 500 words on a separate page

Body of the Manuscript

Text of the manuscript not to exceed 20 pages, including references, tables, etc.

If the manuscript does not meet the guidelines exactly, it will NOT be reviewed and will be returned to the author.

Author(s) name or any other identifying information should not be included on the abstract or the manuscript. Authors are responsible for copyright clearance and accuracy of information presented and submission implies that the same manuscript has not been submitted t other publications.

Editorial reviewers and editors will review all manuscripts. Points of view are those of the individual authors and not necessarily of ISEP.

Please send manuscripts to: Dr. Tack Chan – tchan@kennesaw.edu

For more information about ISEP go to: www.isep.info

ISEP
MEMBERSHIP SUBSCRIPTION FORM
(Please Print)

Name: _____
Last First Middle

Organization/Department _____

_____

Mailing Address: _____

_____
City Province/State

_____
Postal Code Country

Email_____

Fees: Professional Membership and Subscription to Educational Planning = $125.00 USD

Payment by check, money order, or Purchase Order required with application.
NOTE: Annual Membership is based upon the calendar year – January to December.

MAKE CHECK PAYABLE TO: ISEP
RETURN MEMBERSHIP APPLICATION AND PAYMENT TO:
Dr. Carol S. Cash
Secretary/Treasurer, ISEP
ccash48@vt.edu
6543 Cold Harbor Road
Mechanicsville, VA 23111
USA

ORGANIZATION

The Society was founded December 10, 1970 in Washington, DC. Over 50 local, state, national, and international planners attended the first organizational meeting.

Since then its continued growth demonstrates the need for a professions organization with educational planning as its exclusive concern.

PURPOSE

The International Society for Educational Planning was established to foster the professional knowledge sand interests of educational planners. Through conferences and publications, the society promotes the interchange of ideas within the planning community. The membership includes persons from the ranks of governmental agencies, school-based practitioners, and higher education.

MEMBERSHIP IN THE SOCIETY

Membership in the society is open to any person active or interested in educational planning and the purposes of the Society. To join the Society or renew a membership please complete and submit the enclosed form.

Please forward check/money order/PO to:

ISEP
Dr. Carol S. Cash, Secretary/Treasurer
6543 Cold Harbor road
Mechanicsville, VA 23111
USA

EDUCATIONAL PLANNING

EDUCATIONAL PLANNING
Dr. Glen I. Earthman
Publication Center
2903 Ashlawn Drive
Blacksburg, VA 24060
USA