Editorial / vii

Media Strategies to Combat Intimate Partner Violence: Opportunities and Challenges to Active Bystander Promotion in Jamaica / 1


An Evaluation of Health Information Management Policies and Procedures in Jamaica through the Lens of Leadership / 39

Knowledge, Attitudes and Practices of Citizens of West Green in St. James, Jamaica towards Risk Factors of Cardiovascular Diseases / 59

Perception of Parents to Immunize their Children / 84

Assessment of Spacer and Asthma Action Plan Usage in Asthma Management at the Bustamante Hospital for Children in Jamaica / 102

Case Study: Developing and Delivering an Energy Awareness and Conservation Training Programme to Teachers and Students at a Secondary School in Jamaica / 121

Continues on inside front cover
Dedication

This issue of the *Journal of Arts, Science and Technology*, is dedicated to the memory of Mr. Martin Henry, our friend, researcher, author, lecturer, and colleague, who died in 2019. He was the editor-in-chief of the Journal. This dedication is to commemorate his long and distinguished career at the University of Technology, Jamaica.
## Contents

**Editorial**  /  vii  
*Cynthia Onyefulu*

Media Strategies to Combat Intimate Partner Violence: Opportunities and Challenges to Active Bystander Promotion in Jamaica  /  1  
*Nicole Ola Cameron*

*Martin Henry, Paul Ivey, and Tashoya Streete*

An Evaluation of Health Information Management Policies and Procedures in Jamaica through the Lens of Leadership  /  39  
*Nola P. Hill-Berry*

Knowledge, Attitudes and Practices of Citizens of West Green in St. James, Jamaica towards Risk Factors of Cardiovascular Diseases  /  59  
*Abubakar Garba Usman, Reneisha Stephenson, Anastasia Gooden, Tashia Campbell-Hyatt, Theon Hines, and Shanique Martin*

Perception of Parents to Immunize their Children  /  84  
*Racquel Burton-Edwards, Christine Jackson, Antoinette Jackson, Indiana Mcleod, Judith Mendez, and Stacian Walker*

Assessment of Spacer and Asthma Action Plan Usage in Asthma Management at the Bustamante Hospital for Children in Jamaica  /  102  
*Amanda Daley and Lisa Bromfield*

Case Study: Developing and Delivering an Energy Awareness and Conservation Training Programme to Teachers and Students at a Secondary School in Jamaica  /  121  
*Kirkland Rowe, Noel Brown, Therese Chambers, and Elecia Johnson*
A Constructivist Approach to Redesigning an Information Systems Innovation Syllabus: First Steps     / 133
Lisa Facey-Shaw and Sophia McNamarah

A Qualitative Study on Exploring College Instructors’ Integration of Technology in their Content Area Curricula     / 146
Junior Martin

A Glimp at Thier Raiting”: Target Inconsistencies found in the University of Technology, Jamaica Students’ Academic Writing Papers     / 167
Shalieka Burris and Tashieka Burris-Melville

The Effects of Teacher Competencies, Gender, and School Location on Primary School Standardised Academic Test Results in Three Districts in Jamaica     / 190
Melva Armstrong

Notes on Contributors     / 207

The Journal of Arts Science and Technology:
Submission Guidelines     / 213
This issue of the *Journal of Arts Science and Technology* is the first of three issues which will be published in 2020. The second and third issues will be in July and November, respectively.

*JAST* is an international, multi-disciplinary, peer-reviewed journal published by the University of Technology, Jamaica in both hard copy and online on EBSCOHost at http://bit.ly/2cc9STt and the University’s own website at http://www.utechjamaica.edu.jm/about-utech/history-1/publications. The journal carries papers across the diverse fields covered by the University. The eleven research papers are published in this issue.

The first article, “Media Strategies to Combat Intimate Partner Violence: Opportunities and Challenges to Active Bystander Promotion in Jamaica” is timely due to the increase in the number of intimate partner violence in Jamaica. The author provides an overview of the situation in Jamaica and discusses the socio-psychological challenges to bystander intervention in Jamaica as well as the theoretical bases for the use of media strategies and platforms changing attitudes and behaviours about intervening in situations of intimate partner violence. The author recommends the use of media platforms to promote positive bystander attitudes and behaviours in order to combat intimate partner violence in Jamaica.

In the second article, “A Decade of Research and Innovation Management in a Newly Chartered University, 2007–2017: A Critical Review”, the authors critically reflect on an era (2007–2017) of managing research and innovation at the University of Technology (UTech), Jamaica. They describe the roles of research managers in striving to achieve research and innovation goals in the university, as well as highlight the accomplishments of the School of Graduate Studies, Research and Entrepreneurship (SGSRE) with a few staff, and calls for the need to increase the size of its staff.

In the third article, “An Evaluation of Health Information Management Policies and Procedures in Jamaica through the Lens of Leadership” the author examines the health information management (HIM) policies and procedures in Jamaica through the lens of leadership by using a convergent-parallel mixed-method strategy. The article which is a part of a doctoral study highlights the absence of relevant and current policies and procedures for HIM practices in Jamaica, and
the need to overhaul the national and institutional HIM policies and practices by its leadership.

The fourth article, “Knowledge, Attitudes and Practices of Citizens of West Green in St. James, Jamaica towards Risk Factors of Cardiovascular Diseases” the authors explores this topic among the residents of West Green, which is a community in St. James parish in Jamaica.

The findings showed, among other things, that a majority of respondents had a good knowledge of CVDs, and most were classified as having a negative attitude toward CVD risk factors. The authors suggest how to improve the respondents’ attitude as well as recommendations for further studies on other factors that influence persons’ knowledge, beliefs and practices, and for appropriate CVD preventative measures to be put in place.

The fifth article is republished due to the omission of the names of the co-authors. The authors examine the “Perception of Parents to Immunize their Children.” Reflecting Jamaica’s good global standing in immunization, the authors found that, despite some parents having concerns about the safety of vaccination, 92% of children were up to date with their vaccination.

“Assessment of Spacer and Asthma Action Plan Usage in Asthma Management at the Bustamante Hospital for Children in Jamaica” is the sixth article. This hospital is the only children’s hospital in the English Speaking Caribbean catering to patients from birth to 12 years of age. The authors state that “access to spacers among caregivers of children with asthma at BHC medical clinic was very high; however, compliance with its use was low.” They conclude by stating that the “most common errors made were not shaking the MDI before the second puff was given, holding the mask over the child’s mouth and nose for less than 10–15 seconds before the second puff was given (primarily double actuations), and not shaking the MDI before first puff was given.” Recommendations are made by the authors for training sessions on asthma management to be conducted regularly, and for further studies to be done with a larger sample size.

In the seventh article, “Case Study: Developing and Delivering an Energy Awareness and Conservation Training Programme to Teachers and Students at a Secondary School in Jamaica,” the authors focus on the development and implementation of a training programme, which was designed to increase the level of awareness about energy conservation among a group of high students and their teachers in a school in Jamaica. The authors conclude that as a result of the training, there was an increase in the level of energy awareness in that school. The authors’ assumptions are that the energy-saving strategies acquired by the participants during the training would extend beyond the school to the surrounding
communities where the participants reside, and this could lead to a reduction in the residential energy consumption.

In the eighth article, “A Constructivist Approach to Redesigning an Information Systems Innovation Syllabus: First Steps,” the authors present a series of steps in redesigning a syllabus for an information systems innovation course in a university in Jamaica. The authors decided to redesign this course due to the emerging technologies and the need to keep computing students up-to-date with the rapid changes in the field of technology. The new focus is to make the course more student-centred through the use of the constructivist approach to learning.

“A Qualitative Study on Exploring College Instructors’ Integration of Technology in their Content Area Curricula,” is the ninth article in this issue. The author argues that for the pre-service students to integrate technology in their lessons, the instructors teaching the pre-service students should be doing it first. The author investigates the barriers to technology integration, and ways of addressing these challenges by using the educational technology framework, and the technological, pedagogical, and content knowledge (TPACK) model. Among other things, the author identifies instructors’ lack of readiness to technology integration as one of the barriers and recommends professional development programmes to address this shortcoming.

In the tenth article, “A Glimp at thier Raiting”: Target Inconsistencies found in the University of Technology, Jamaica Students’ Academic Writing Papers,” the authors used a quantitative approach to investigate target inconsistencies in the argumentative academic writing essay scripts of 30 students at the University of Technology, Jamaica. Among other things, the authors found four types of inconsistencies; grammatical, lexical, discourse and mechanical, and conclude that the participants had writing challenges that needed to be addressed.

The final of the eleven articles, “The Effects of Teacher Competencies, Gender, and School Location on Primary School Standardised Academic Test Results in Three Districts in Jamaica,” the author examines the relevance of the academic training received by primary level educators, their years of teaching experience, and their students’ academic development in primary schools in Jamaica. By using logistic regressions, the author concludes that students’ gender was a statistically significant predictor for the standardised academic test scores for students in primary institutions, school location was inconsistent as a predictor for students’ achievement, and that “female students were about two times more likely to attain mastery in their standardised test scores than males.”
Media Strategies to Combat Intimate Partner Violence: Opportunities and Challenges to Active Bystander Promotion in Jamaica

NICOLE OLA CAMERON
University of Technology, Jamaica

Abstract

Jamaica has the highest rate of intimate partner violence in the Caribbean. How to reduce these violent acts, often committed against women, continue to be a high socio-political agenda item. One promising avenue that could address intimate partner violence is public awareness of the role bystanders can play in these situations. Bystanders are third party witnesses who can help before, during or after violent acts. Bystander programmes in other countries have seen much success and provide templates and learning opportunities for Jamaica. However, there are attitudes, norms and behaviours related to bystander involvement which pose tremendous challenges. Any attempt at attitudinal and behaviour change will have to be mindful of these cultural factors. This paper discusses bystander intervention and the attendant challenges that exist in Jamaica. Importantly, the paper also makes recommendations on how a variety of media strategies and platforms can be used to address these challenges while promoting positive bystander attitudes and behaviours.

Keywords: media campaigns, bystander intervention, intimate partner violence, violence against women, entertainment-education, media campaigns, health communication

Introduction

Intimate partner violence is a global health threat. It is estimated that at least one in every three women worldwide are victims of this heinous crime (World Health Organization, 2017). The negative impact of intimate partner abuse is not limited
to the victim and the perpetrator but also has severe consequences for families and society at large. Although both men and women are at risk and do suffer from intimate partner violence, women are the main victims and suffer more (Hamberger & Larson, 2015). Within the Caribbean, Jamaica has the highest rates of intimate partner violence with the lifetime prevalence of physical and sexual violence against Jamaican women standing at 27.8% (Williams, 2018). The country also suffers from low rates of victims reporting incidents to the police and the police themselves have been criticized for being soft on cases (Arscott-Mills, 2001).

Intimate partner violence is an act of violence – physical or otherwise – that is perpetuated by a current or former romantic partner (Catalano, 2013). Victims, families, communities and nations pay a high cost for partner violence. Additionally, victims suffer from health problems such as injuries, depression, post-traumatic stress disorder, suicide attempts, and sexually transmitted diseases (Krug et al., 2002; Williams, 2018). Children also pay the cost of intimate partner violence with reports of children suffering from bedwetting, nightmares, aggression, withdrawal behaviour, poor school performance, absenteeism; and sometimes resorting to running away from home (Catalano, 2013; Williams, 2018). Intimate partner violence also takes a huge toll on the country’s health care system, and the economy suffers due to loss of man-hours and productivity (WHO, 2017).

A working group formed by Prime Minister, The Most Honorable Andrew Holness to make recommendations on how to tackle violence against women and children, proposed the implementation of multifaceted awareness campaigns (Partnership for a Prosperous Jamaica Working Group, 2018). They recommend that the campaigns should address the correlates of violence against women and use different media platforms to promote relevant messages. One such message and solution that is not well entrenched in Jamaica is bystander intervention. Witnesses or disinterested individuals who are knowledgeable of the incident and can do something to help are able to help. This strategy offers the opportunity for everyone to play an active role in helping to address intimate partner violence situations. In the United States, some advocates are adamant that bystander intervention may be the most effective way of reducing interpersonal violence in certain settings (Berkowitz, 2009). The extent to which this may work in Jamaica needs exploration, but the possibilities exist.

To increase bystander participation requires the dissemination of information as well as active citizen engagement. The media provide tremendous opportunities to play a role. Given the high saturation rates in the country, I propose that the media can be better utilized to combat intimate partner violence by promoting positive bystander attitudes and behaviours. The invitation to the entire citizenry
to become active in reducing intimate partner violence makes bystander intervention attractive and can be deployed to address all causes and correlates of intimate partner violence. This paper begins with a discussion of intimate partner violence in Jamaica by providing an overview of the prevalence rates and socio-cultural factors that influence these rates. This is followed by an overview of bystander intervention, and a summary of theoretical bases for media effects are examined. The paper then examines some of the socio-psychological challenges to bystander intervention in Jamaica. The paper concludes with recommendations of media platforms and messaging strategies that can be used to promote positive bystander attitudes and behaviours in Jamaica.

Intimate Partner Violence in Jamaica

Intimate partner violence is characterized by acts of aggression and involves physical violence, sexual aggression, financial abuse, any coercive controlling behaviours and attitudes aimed at a current or former intimate partner (Catalano, 2013). In its first national survey of the prevalence of different forms of intimate partner violence, approximately one-fourth of Jamaican women report experiencing physical violence by a male partner, 7.7% report being sexually abused by a partner, over 28% report some type of emotional abuse and close to 9.0% say they have experienced economic abuse by the hands of an intimate partner (Williams, 2018).

Previous research found that the risk behaviours for intimate partner violence are childhood experience of violence, controlling partner behaviour, and alcohol use (RHS, 2008; Williams, 2018). Forty-seven per cent of women who have been in an intimate relationship report experiencing at least one controlling behaviour in their lifetime (Williams, 2018). This is important to note, as research shows that controlling behaviours strongly predict later violence in relationships (Fawson, 2015). Additionally, local discourses on intimate partner violence reinforce gender stereotypes which perpetuate the construct of women as acquiescent in their partnerships. Any transgression of this role is thus room for violence to be used as an enforcing agent of female ‘good behaviour’ (Plummer, 2013). Moreover, some women believe that violence between a husband and wife is a private matter which inhibits reporting and oftentimes traps women in these relationships (Williams, 2018). This notion is problematic to bystander intervention as this attitude can cause women to reject the intervention of others, as well as lower their own intervention behaviours.

There are also demographic correlates to intimate partner violence. Rural women are more likely than urban women to think that a woman should tolerate violence
to keep her family together (Williams, 2018). Low education among women is one of the strongest predictors of victimhood (Imbusch, Misse, & Carrion, 2011). Education also correlates with less belief in gender roles and belief that there is justification for relationship violence (Williams, 2018). Worldwide, numerous studies have shown that socio-economic status is one of the strongest predictors and in some cases the strongest predictor of intimate partner violence (Cunrandi, Caetano, & Schafer, 2001; Khalifeh, Hargreaves, Howard, & Birdthistle, 2013). In one study of poor urban communities in Kingston, Jamaica, women reported that intimate partner violence is a common occurrence in daily life (Moser & Holland, 1997). They felt that the socio-economic circumstances around them silenced them. They report stories of everyday domestic brutality, fear and a sense of being trapped. Additionally, the women report perceived causes to be influenced by unemployment and feelings of hopelessness. This was also the view of police in the area who saw intimate partner abuse as a consequence of men’s role as breadwinners for their families being weakened. Weakened earning power by women also contribute to the problem where women rely on men as breadwinners, so they remain in these abusive relationships in order to reap economic benefits. More recent research confirms this with economic vulnerability correlating with justification for violence. Approximately 11% of unemployed women, 17% of those outside of the labour force, and 13% of women who work at home believed that intimate partner violence is justified under some circumstances (Williams, 2018).

Earlier reports identified that 62% of women did not report instances of intimate partner violence as they thought that they could solve the problem by themselves or that it was not severe enough for them to get help (RHS, 2008). For the women who experienced sexual or intimate partner violence, 37% report that they did not seek help or tell anyone about the violence. Sixty-two percent said they told a friend or family member about the abuse, and 31% sought institutional help with 28% of the 31% reporting the matter to the police. As the results show, women who are abused are unwilling to go to the authorities for help, which is generally true worldwide (WHO, 2017). Additionally, studies also show that most women in the earlier sample who experienced intimate partner violence – 75% – do seek medical care after being abused. The first point of contact is pastors and counsellors, and most cases do not go to the police (Arscott-Mills, 2001). Although women do not report incidents of intimate partner violence to law enforcement, the fact that they do tell someone presents numerous opportunities for bystander intervention. Whoever they report the incident to or whoever may witness the incident first-hand has the potential to become an active bystander and to be an agent of change and support for victims and in so doing may help change attitudes.
Bystander Intervention

The role of third party-witnesses to acts of violence and the possibilities they possess to help began to interest researchers in the 1960s after a young girl was raped and murdered in New York while an entire neighbourhood watched and did nothing (Fischer et al., 2011). Bystanders could be anyone not directly involved, but witness the act of violence either first or second-hand (Banyard, 2008). Bystander intervention is proposed as one avenue to help in these situations due to the community response that it engenders. Unlike many other approaches that place the pressure on surviving victims only to act, bystander intervention invites everyone to be an active agent of change. It works on the principle that everyone if he or she so desires, can do something to send a message that such acts are not welcome and accepted. An active bystander is one who takes responsibility and intervenes in some way before, during or after the act of violence (Banyard, 2008).

The goal of bystander promotion is to encourage individuals who are in these situations to do something. There are numerous ways that individuals can intervene. Individuals can call the police or other authority, they can stop an incidence of violence from occurring, can ensure the wounded – if necessary – get medical attention, can serve as a witness in a legal proceeding and can even just be there to provide emotional support (Bennet, Banyard, & Garnhart, 2014).

As previously mentioned, many victims of intimate partner violence do not report the incident to law enforcement but will confide in a church leader, friend or relative (RHS, 2008). In many instances as well, neighbours or other community members directly witness the incident as it unfolds. But what do these witnesses do? Research shows that numerous individual and personal factors determine intervention in incidents of intimate partner violence. Labhardt, Holdsworth, Brown, and Howat (2017), in their review paper, created a model that predicted factors that determine active intervention. These factors include attitudes towards intervention, efficacy perceptions, and intentions. Additionally, gender is an important individual factor. Extensive research confirms that women are much more likely to intervene than men (Burn, 2009; Chabot et al., 2009; Fischer et al., 2011). Gender also determines how someone may intervene with men more likely to intervene by stopping the perpetrator while women are more likely to help the victim (Chabot, 2009; Fischer et al., 2011). Explanations given for this include the role that peer norms play with male peer norms tending towards enforcing traditional masculinity norms (Carlson, 2008; Leone, 2016). In addition, if an individual thinks others will or will not intervene, then he or she is more likely to mirror this perception (Hust et al., 2013). Men also are found to attribute more
blame and exhibit less empathy to victims which may be contributing factors as well (Katz, Pazienza, Olin, & Rich, 2015). On the other hand, women show more bystander willingness which is attributed to women reporting more prosocial attitudes than men (Banyard, 2008). Women also are more likely to identify with the victims, resulting in them being more likely to help (Gerber et al., 2004; Lambdin, 2005).

Rape myth acceptance is another factor that impacts bystander outcomes. Rape myths are stereotypical and false beliefs about the causes and factors relating to sexual aggression and assault. Unfortunately, rape myths tend to blame victims for the violence committed against them while exonerating perpetrators (Lonsway & Fitzgerald, 1994). Some examples of rape myths include believing that women routinely or commonly lie about rape, that an intoxicated victim is responsible for any sexual violence against her, or that if a victim does not fight back, then it cannot be rape (Lonsway & Fitzgerald, 1994). These misogynistic beliefs carry over to attitudes towards intimate partner violence. Research shows that willingness to help in situations involving interpersonal violence correlates with less rape myth acceptance. On the other hand, higher levels of belief in rape myths correlated with decreased willingness to help in these incidents. Research examining the influence of acceptance of rape myth influence on bystander attitudes and behaviour related to intimate partner violence is sparse but shows that stronger belief and acceptance of rape myths predicts bystander behaviours (Hust et al., 2013; McMahon, 2010).

Theoretical Basis for Media Effects

Theoretically, the media has the potential to change attitudes and behaviours about intervening in situations of intimate partner violence. In this section, I will review three theories of media effects that provide evidence for the use of the media to promote positive health attitudes and behaviours.

Social cognitive theory. Social cognitive theory (Bandura, 1977; 2001) proposes that observing one’s environment leads to the learning of new attitudes and behaviours. The media expands one’s environment from only the immediate to include mediated environments that present an almost infinite number of opportunities for learning. Mass media provide what Bandura (2001) termed ‘symbolic environments’ which broaden the scope of models and behaviours available to us for observation. For example, when an individual watches a film, he or she is exposed to many modelling opportunities that provide references on how to act in specific situations. Observing these behaviours in the media allows individuals to internalize values that help determine their perceptions of reality,
perceptions that in turn, influence their behaviours and attitudes. Additionally, Bandura (2001) stresses the importance of self-efficacy, which is the perception of one’s ability and skills to perform a given behaviour. According to social cognitive theory, if an individual feels confident that he or she has the skills to do, he or she will perform positive bystander behaviours after media exposure to positive models.

**Cultivation theory.** Cultivation theory (Gerbner, Gross, Morgan, & Signorielli, 1986) also provides theoretical foundations for how the media affects individuals. According to cultivation theory, heavy consumption of television content creates a media-induced perception of reality. Therefore, individuals who consume much television will come to view the world as constructed in the media. Cultivation theory is underlined by two main assumptions. Firstly, the theory points out that media-influenced perceptions of reality are developed over time. In other words, short term exposure will not necessarily change perceptions or behaviour. The second assumption is that the perceptions developed are influenced by a unified and homogenized perspective of reality that television, and by extension, the general media, present. Gerbner, Gross et al. (1986) point out that mainstream media perpetuates mainstream values. For example, cultivation effects have been found among television watchers which suggest that consumption of television content increases rape myth acceptance (Kahlor & Eastin, 2011; Kahlor & Morrison, 2007). Additionally, frequent exposure to sports media also reinforces rape myth beliefs (Hust, Lei, Ren, Chang, McNab, Marett & Willoughby, 2013). Therefore, to change these values applying cultivation theory to bystander intervention, media programmes are needed that will instead portray positive prosocial messages which in turn should help to develop positive bystander behaviours overtime.

**The integrated model of behavioural prediction.** The integrated model of behavioural prediction (Fishbein & Yzer, 2003; Fishbein & Capella, 2006) draws on multiple theories including social cognitive theory (Bandura, 2001) to propose how the media influence behaviours. The model predicts that the media directly influence individuals’ attitudes, norms and efficacy. These factors then influence an individual’s intentions which are the strongest prediction of behaviours. According to this theory, if the media portray positive bystander attitudes and behaviours, these portrayals can directly change any negative attitudes and norms and also can change individuals’ perceptions of their own ability to intervene successfully. Then they will form positive intentions, and ultimately, they will act in a positive way if a situation arises. Research shows, for example, that media influence the formation of attitudes relating to rape myths (Hust, Lei, Ren, Chang, McNab, Marett & Willoughby, 2013; Kahlor & Morrison, 2007). Similarly, previous research shows that individuals who thought their peers would intervene
were more likely to intervene themselves (e.g., Hust et al., 2013). The literature on normative perceptions supports the idea that media effects on norms may indicate the likelihood of behavioural adoption. Media can also change individuals’ perceptions of their ability to help. Self-efficacy is an important variable because an intervening bystander must feel that he or she is personally capable of intervening in some way on an abusive situation if it occurs (Banyard, Plante & Moynihan, 2004). There is adequate research showing that higher self-efficacy significantly predicts intentions to intervene as well (Banyard, 2008; McMahon, 2015; Moynihan et al., 2011). Similarly, individuals who do not think that they have the skills to intervene are more likely not to intervene (Bennett, Banyard, & Garnhart, 2014).

**Challenges to Bystander Intervention in Jamaica**

Given the success of bystander programmes internationally, the question arises whether bystander education and promotion would be efficacious in Jamaica. There are numerous socio-cultural challenges that could impede bystander promotion. First, Jamaica is notorious for its anti-whistleblowing or anti-informer culture. This subculture is summed up in the popular saying ‘informer fi dead.’ Essentially, the statement proclaims a death sentence on anyone who interferes in another’s affairs. It emphasizes that people should mind their own business. Donna Hope (2010) explains that to be labelled ‘informer’ is to be a “community traitor” (p. 46). Especially in inner-city communities which record-high rates of violent crimes, including intimate partner crimes, to be an informer is “akin to committing an act of treason against the State” (p. 47). Another crucial element of the ‘informer fi dead culture’ is the rejection of a disinterested party reporting a crime to the police (Hawthorne, 2017). This cultural taboo is reinforced in popular discourses such as dancehall music (Hope, 2010). In numerous dancehall songs, artists call for informers to pay with their lives which only serve to perpetuate the attitude.

The anti-informer culture is also an intrinsic aspect of masculinity performance in Jamaica. This creates a space for the continuity of a subculture which yokes violence, masculinity and anti-informer sentiments together in an inseparable mix. This sub-culture also discursively makes law enforcement the enemy, a part of ‘Babylon,’ which culturally is a derogatory term, used to refer to State control and oversight (Hope, 2010). This creates a kind of code of silence which keeps any individual silent, even if he or she knows the criminals. This sentiment carries over to incidents of intimate partner violence and feeds into a cultural apathy translated into minding one’s own business. Citizens are already, therefore socialized...
to not interfere in any incident that does not directly affect them. Potential helpers are hesitant due to a fear for their lives, and fear of ostracism, which are the consequences of being an informer (Hawthorne, 2017). The State has tried to address this with programmes such as Crime Stop, which provides an anonymous telephone line to report crimes. However, the culture of silence is still very strong and continues to be a challenge.

Bystander intervention in Jamaica is also potentially challenged by a lack of trust in the State authorities such as the police. During colonial times, state authorities were oppressive elements against the majority black population which engendered mass distrust. These sentiments have carried over to an independent Jamaica where police-community relations continue to be highly problematic. Only 19% of women who told others about their experience of violence report the matter to the police (Williams, 2018). Ideas that the police tend to be soft on intimate partner violence and treat it as a private issue pervade the society alongside other fears that the police will not do anything in such situations. The government and civil society have tried addressing these concerns through numerous interventions, and the police force itself has changed its corporate strategy to one of ‘community policing’ aiming to reduce high levels of mistrust (National Crime Prevention Strategic Plan, 2007–2011). However, recent research shows that trust remains low. When asked to indicate their level of trust in the police on a scale of 1 – indicating no trust in the police to 7 – indicating trusting the police a lot, close to 50% of a national sample scored between 1 and 3, 18.5% were not sure, and only 24% indicated some trust in the police (Harriot, Lewis, Hinton, & Zechmeister, 2018). This lack of trust is fed by the public perception that the police is corrupt and incompetent. This makes individuals less likely to report crimes and also presents a context where bystander intervention may possibly be focused more on helping without police interference. Research is needed to understand how this may affect public perception of helping, and how it affects the public versus private perception of intimate partner violence.

Researchers have also identified that there are cultural norms that perpetuate the belief that violence in relationships is justified. Earlier studies show that young inner-city Kingston women believe that violence in their romantic relationships was inevitable (Bailey, Le Franc, Branche, 1998). More recent research shows that approximately 10% of women surveyed believe that violence by a male partner is justified, especially if the woman neglects her children (Williams, 2018). Interestingly, married women are less likely to believe violence is justified in romantic relationships than single women. Although some women think violence is justified, women are still more likely to agree that men do not have the right to
hit their partners. On the other hand, it is troubling that one-fifth of young men in Jamaica think that a man has the right to hit his partner for at least one specified reason, especially if his wife has been unfaithful, or his wife disobeys him (RHS, 2008). These sentiments reinforce toxic masculine norms and normalize relationship violence.

Another socio-cultural norm that justifies violence in relationships is the belief that violence in romantic relationships is an expression of love. Moser and Holland (1997), in their study of poor urban communities in Kingston, found that violence in relationships was interpreted as love. Women would express that ‘he only loves me if he beats me’ which justifies violence and constantly put women at risk and perpetuate a culture that devalues women (Williams, 2018). Physical violence is interpreted as just ‘punishment’ for women who step out of line. Men also express that they think women expect physical violence and the fact that women stay in the relationship and do not fight is confirmation (Williams, 2018). Men justify violence as one way to keep women in line and to show male dominance. Women, unfortunately, are co-opted into this ideology which creates an unending cycle of abuse violence. Moreover, research shows that many women who experienced violence in their partnerships did not seek help because they thought violence was normal and not a serious matter (Williams, 2018). Bystander intervention in this context would not see helping as a possible response, as bystanders themselves may justify violence of this nature. Ways to challenge and change these attitudes are urgently needed.

Opportunities

The following messaging strategies and platforms are proposed as possible solutions to address the socio-cultural barriers to bystander intervention:

**Entertainment–education.** Entertainment–education (EE) is a message strategy that uses stories specially designed to teach about specific societal problems (Singhal & Rogers, 1999). EE messages usually aim to “increase audience members' knowledge about an educational issue, create favourable attitudes, shift social norms, and change the overt behaviour of individuals and communities” (Singhal & Rogers, 1999, p. 9). Unknown to many, Jamaica is a pioneer in using entertainment–education programming to elicit social change. As far back as the 1970s, Elaine Perkins was a pioneer in this field using EE programmes to influence social change, particularly in the area of family planning (Singhal & Rogers, 1999). EE programmes have enjoyed much success around the world regarding different types of violence against women. Examples include increasing knowledge and
attitudes concerning the empowerment of women (Usdin, Singhal, Shongwe et al., 2004). Additionally, television soap operas in India and in South Africa have incorporated messages designed to decrease specific kinds of violent acts against women (Singhal & Rogers, 1999; Usdin, Singhal, Shongwe et al. 2004). These programmes have addressed issues such as masculinity norms and were also used to increase understanding and awareness of intimate partner violence (Dill-Shackleford, Green, Scharrer, Wetterer, & Shackleford, 2015). Studies from the United States have shown that EE can increase self-efficacy and can teach bystander behaviours related to sexual violence (Hust et al., 2017). In Jamaica, NGOs and government agencies can find ways to create and broadcast EE messages to address multiple aspects of intimate partner violence such as increasing awareness about the correlates, risky attitudes and behaviours, gender norms, conflict resolution, aggression tactics among other elements.

Social media. Recent reports show that Jamaicans are avid social media users. One report shows that between January and March 2019, Facebook was used by 64% of Jamaicans, Pinterest (22%), Twitter (5%), Youtube (4%), and Instagram (4%) (Statscounter, 2019). Among Jamaican teenagers aged 13 to 18, the rates are much higher, with 83% report spending between one and three hours daily online. Platforms such as Instagram are used by 59% teenagers, followed by Snapchat at 58%, Twitter at 57%, Tumblr at 48%, Facebook at 47% and Youtube at 21% (Golding, 2018). Social media are fertile grounds for promoting messages tackling intimate partner violence. Although much research is yet to be done to understand how different message elements and psychological processes work in reducing intimate partner violence, early research indicates rich possibilities. For example, Andersen, Medaglia, and Henriksen (2012) found that social media use can provide empowerment in health contexts for patients. Health organizations also use social media to disseminate health information and studies have found that followers of health organizations on Twitter like and retweet personal health action-based messages (Park, Reber, & Chon, 2016). This means that individuals are interested in messages on social media that relate to personal interests and situations. These results also indicate that individuals are engaged online and become disseminators themselves.

Social media is also known to offer space for the development of online communities. For example, one study found that individuals share on social media the mental health consequences of intimate partner violence they experienced (Liu, Xue, Zhao, Wang, Jiao, & Zhu, 2018). In 2016, the hashtag #Maybehedoesnthityou trended in the United States where individuals shared experiences and advice related to abuse beyond physical intimate partner violence. A follow-up study revealed
that victims freely shared their experiences with multiple types of non-physical violence, emphasized that abuse may happen with partners of all genders, and users provided social support for others (McCauley, Bonomi, Mass, Bogen, & O’Malley, 2018). These results underscore the power of social media to engage public discourse, provide a space for seeking, as well as for providing, social support. This can have a tremendous impact and should be pursued more aggressively here in Jamaica.

**Text messages.** The use of text messages is another promising channel. Text messages are useful as they are simple, inexpensive, convenient, and they diffuse efficiently. They also have the potential to be used to prevent or stop intimate partner violence from occurring at all through appropriate attitudinal interventions. These characteristics make texts easily adaptable for multiple applications. The research in this area is sparse but does provide useful insight. Researchers show that adolescents use text messages to inquire about sensitive sexual health information (Willoughby & Jr. Jackson, 2013). Also, texts have been used to disseminate health information and generally have a high uptake (Willoughby & L’Engle, 2015). More specifically relating to intimate partner violence, one study found that text messages increase knowledge of intimate partner violence warning signs and increase confidence to intervene in situations of intimate partner violence (Constantino, Wu, de la Cruz, Burroughs, Hwang, Henderson, & Braxter, 2014). Additionally, researchers incorporated text-messages into bystander intervention programming and saw successes over time as the messages helped to build participants’ autonomy to help (Brickman, 2017). Text messages are, therefore, a simple way to increase the public’s knowledge and promote positive attitudes and behaviours related to bystander intervention and intimate partner violence that should be further explored locally.

**Traditional media.** Although new media platforms offer promising opportunities, traditional media continue to be fruitful platforms that have an enduring role in promoting any prosocial behaviour such as bystander intervention. Especially in developing countries like Jamaica, mass media still enjoy a wide reach among all media platforms and are probably the most ubiquitous platforms to promote any form of content, especially those that address social issues such as intimate partner violence. For example, mass media campaigns can be used to disseminate EE content and have been extremely successful in the past. Additionally, research shows that many misogynistic attitudes and beliefs are normalized by traditional media (Kahlor & Eastin, 2011), and therefore, these platforms can be used to normalize positive prosocial attitudes and behaviours. Posters fall in this category and have been used in the United States to promote
positive bystander attitudes and behaviours, including increasing bystander intentions, and knowledge about bystander intervention in situations involving sexual violence (e.g., Potter, Moynihan, Stapleton, & Banyard, 2009; Salazar, Vivolo-Kantor, Hardin, & Bekowitz, 2014). The opportunities are numerous and should be continuously explored.

**Virtual reality.** Using virtual reality (VR) for health outcomes is a burgeoning field; however, research shows that there is much potential. Virtual reality refers to any simulated online environment or world (Zyda, 2005). These worlds can be similar or completely different from the real world, depending on their purposes. Applications of virtual worlds have been used in a variety of contexts, but probably most often as entertainment in the form of games. In health contexts, virtual reality techniques have been applied in a range of health-related applications, including for educational purposes (Srivastava, Das, & Chaudhury, 2014). In virtual worlds, participants often have the opportunity to engage as avatars. These are characters in the worlds (Gabarron, Serrano, Wynn, & Armayones, 2012). Psychologically though, avatars provide users with anonymity and freedom, which can help them break out of normative social behaviours (Gabarron et al., 2012). In addition, avatars have the potential to serve as models, and can even be programmed to behave independently of the user (Gabarron et al., 2012). Bystander education could benefit from this technology.

There is a sparsity of research investigating the use of virtual reality for interventions related to intimate partner violence. The education applications of VR indicate that it has the potential to be used to change attitudes, not only behaviours. This is an important possibility for bystander education. One study recruited perpetrators of IPV to enter a virtual world to test whether their experiences would change their attitudes (Seinfeld et al., 2018). The goal of the study was to investigate how changing the perspectives of perpetrators, enacted through virtual embodiment, impacted participants’ ability to recognize fear in females, which is associated with IPV perpetration (Seinfeld et al., 2018). In this VR experience, male participants entered the virtual world, and their avatar was a female. They then encountered an abusive virtual partner. Results showed that after exposure, perpetrators were more able to improve their ability to identify fearful female faces and reduced their bias to recognize female faces as happy (Seinfeld et al., 2018). This study demonstrates that barriers to bystander intervention could possibly be challenged in virtual worlds. Another study highlights that virtual health education using virtual reality is more likely to be successful with younger audiences since they are more likely to accept and use such technology (Taylor, Taylor, Vlaev, & Elkin, 2017).
Games. The effects of violent video games have seen much scholarly attention. However, there is a growing body of research which shows that playing video games can promote prosocial attitudes and behaviours. Playing prosocial games increases helping behaviours, and individuals who play these games are more likely to intervene in harassment situations, exhibit increased prosocial attitudes which in turn leads to more prosocial behaviours (Greitemeyer & Osswald, 2010; Saleem, Anderson, & Gentile, 2012). Moreover, having players team up to play games also has a positive impact. Velez, Greitemeyer, Whitaker, Ewoldson, and Bushman (2014) found that playing in groups increases helping behaviours (Velez, Greitemeyer, Whitaker, Ewoldson, & Bushman, 2014). The use of avatars in virtual worlds and games, as mentioned previously, also have much potential. These are promising trends that can be further explored in relation to increasing positive bystander attitudes and behaviours in intimate partner violence situations. Games can be constructed to teach positive attitudes to bystander intervention, to tackle misogynistic attitudes and behaviours and to break down cultural barriers to intervention. More research is needed in this area to understand comprehensively how playing video games can be used in the fight against intimate partner violence.

Conclusion

The purpose of this paper was to propose how media strategies and platforms could be used to promote positive bystander attitudes and behaviours in Jamaica. Given the high rates of intimate partner violence, a multi-faceted approach is needed, and bystander intervention is one such approach that has promise. The entertainment-education strategy, along with social media, virtual reality, games, text messages and traditional media, should all be engaged to address the scourge of intimate partner violence. However, challenges such as high levels of distrust of the police, an anti-informer culture, and beliefs that justify violence against women will have to be overcome to ensure success. Additionally, given the success of bystander interventions abroad, research is needed to examine how such programmes can be implemented in Jamaica. One certain thing is that as a country, collective effort is needed. With adequate resources and an engaged citizenry, the country can move past intimate partner violence, and more broadly, against all forms of interpersonal violence.
References


A Decade of Research and Innovation Management in a Newly Chartered University, 2007–2017: A Critical Review

MARTIN HENRY, PAUL IVEY, AND TASHOYA STREETE
University of Technology, Jamaica

Abstract

In 2007 the University of Technology, Jamaica, established a School of Graduate Studies Research and Entrepreneurship (SGSRE). A major part of the remit of this new unit in the young university – upgraded from College to University in 1999 – was to promote research at the institution. The SGSRE quickly acted to build out and operationalize a Research and Innovation Management (RIM) ecosystem within the institution by implementing a suite of deliberate actions. The University/SGSRE also participated in several international projects intended to build staff capacity, most notably the European/EDULINK-supported project for “The Improvement of Research & Innovation Management Capacity in Africa and the Caribbean for the Successful Stimulation and Dissemination of Research Results (RIMI4AC).” The RIMI4AC project allowed the University/SGSRE to serve as the Secretariat for the Caribbean Research & Innovation Management Association (CabRIMA), a major project outcome. These RIM-related projects also connected the University to the global professional field of research and innovation management, as well as positioned the institution to play a significant leadership role in supporting national and regional partnerships. In this paper, the authors adopt a reflective, retrospective, and experiential approach, complemented by documentary analysis, to critically review the RIM functions and achievements of the University for the period 2007–2017; they also discuss lessons learned in the context of international RIM, and offer projections for future growth and engagement. The sharing of these authentic experiences is important for RIM practitioners, especially those in newly chartered universities, in developing countries.

Corresponding author: Paul Ivey: paul.ivey@utech.edu.jm
Keywords: research and innovation management, capacity building, University of Technology, Jamaica, RIMI4AC

Introduction

Research Management

Research management, according to the Association of Commonwealth Universities (ACU, 2006), comprises a distinct suite of activities undertaken at the institutional level to add value to the research carried out by staff, but are separate from the conduct of research itself. Additionally, Langley and Garnett (2015) noted that “research management and administration have developed in line with the trends affecting research itself, which has seen growth in scale, complexity, and management burden” (p.16). And, further underscoring the important role of the research management function and research managers, the European Commission (EC) described the profession as a “critical enabler” of its research and innovation goals, which are directed at achieving growth, impact, and sustainability (Langley & Garnett, 2015).

In terms of the key functions of research managers, Research Africa (2013) identified a suite of specific actions that fall within the scope of their responsibilities. These include:

- Shaping institutional research strategies (understanding the global research environment and developing systems to nurture the next generation of researchers in one’s institution);
- Project development (scouting for funding opportunities and appropriate networks, be aware of funding do’s and don’ts, assist with funding applications, budgets and progress reports);
- Project management (managing the legalities of contracts, setting up systems that support and streamline grant management, monitoring progress of projects, financial expenditure and reporting, protecting intellectual property);
- Public engagement (highlighting the extent and nature of one’s institution’s research work, ensuring the effective dissemination of research findings);
- Policy and governance (driving policies on research and processes around ethics); and
- Enhance research collaborations (be a hub of expertise on sound partnership practices; facilitating intellectual property management and appropriate technology transfer).
In addition, following the advent of the need for research managers, efforts have been made to “professionalize” the field. This has seen the establishment of various national, regional and international research and innovation management associations.

In 2001, the international network of research management societies (INORMS) was formed to bring together research management societies and associations from across the globe. Its purpose is to enable interactions, the sharing of good practice, and joint activities between the member societies, to the benefit of their individual memberships. INORMS holds a biennial congress, hosted by one of its member societies, that creates an opportunity for research leaders, managers and administrators to come together, network, share best practices, and co-learn (www.inorms.net).

One of the main activities of the various research management associations and INORMS is building the capacity of their members – through various training modalities – to more effectively serve their clients (researchers). For example, the Association of Research Managers and Administrators of the United Kingdom ARMA (UK) developed the “Professional Development Framework for Research Managers” that included nine skill areas under three main categories: general competencies, technical skills, and enabling skills.

The University of Technology, Jamaica has embraced research and innovation management and has significantly strengthened its RIM capacity and practice.

Research and Research Management: University of Technology, Jamaica

The University was established by Act of Parliament in 1999 as an upgrade from college to university of the College of Arts Science and Technology (CAST) which had been operating since 1958 as a polytechnic type training institution. The “objects” of the new university would be:

(a) to advance education and development of technology through a variety of patterns, levels and modes of study and by a diversity of means by encouraging and developing learning and creativity for sustainable development for the benefit of the people of Jamaica, the Caribbean and elsewhere, (b) to preserve, advance and disseminate knowledge and culture through teaching, scholarship and research; (c) make available the results of such research and service; and (d) promote wisdom and understanding by the example and influence of corporate life. (University of Technology, Jamaica Act, 1999, pp.14–15)
It is generally agreed that research output is one of the key indicators that sets a
university apart from other post-secondary institutions (Organization for Economic
Cooperation & Development, 2004). So, on being accorded University status, it
was important for the University of Technology, Jamaica to establish and implement
a coherent research agenda and a supporting ecosystem of research management.
Accordingly, the Office of Research and Graduate Studies (ORGS) was initially
established (Onyefulu & Ogunrinade, 2005).

In 2007 with the appointment of a new president who set about establishing
research, graduate studies, and entrepreneurship as major thrusts at the institution,
the ORGS was replaced by the School of Graduate Studies, Research, and
Entrepreneurship (SGSRE) on April 1, 2007, as the unit responsible for Research
and Innovation Management (RIM) at UTech, Jamaica.

The SGSRE, as conceptualized, leads and manages the development and delivery
of graduate programmes in line with international standards and best practices.
Flowing from the research mandate of the University, the School guides and
supports research activities, with a particular focus on inter-disciplinary and applied
research relevant to economic and social problems/needs. As an income-generating
centre of the University, the School guides and supports entrepreneurial activity
primarily through the delivery of consultancy services and the creation of research
& development innovations. The School also provides guidance and supervision
for the academic publications of the University. In addition, the School implements
the intellectual property rights policy of the University (Terms of Reference, Board
Graduate Studies Research & Entrepreneurship, 2009)

The University mandated its Board of Graduate Studies Research and
Entrepreneurship to “Develop, oversee and monitor processes for the effective
implementation of resolutions, policy and procedures to support the University’s
strategic objectives in relation to research, and research training within the
University.” The research mandate aims to promote applied and commissioned
research that will provide solutions to societal needs” (Ivey et al., 2015, p.8).

This would require the development of capacity in research and innovation
management.

Research environments have become increasingly complex . . . Highly skilled
individuals who have a clear understanding of the research world and well-
developed administrative skills are invaluable to research institutions. A research
manager’s key roles are to make sure that their institutions’ research programmes
are on track and to provide researchers with a supportive environment, smooth
funding flows, assistance in identifying appropriate research partners, and
administrative support. Thus, research managers can help institutions to keep their research strategies current and appropriate, while assisting researchers to find funding, and meet their reporting and budgetary obligations. (Research Africa, 2013, p. 22)

Early in its life, the SGSRE held extensive consultations with its internal stakeholders and quickly established critical areas of research focus derived from the disciplines within the University.

Research at UTech, Jamaica is governed by the University’s Research Policy, which provides the overall framework for conducting, supporting and rewarding research. The purpose of the Research Policy is to:

• provide guidelines for ensuring the integrity of research activity in the university.
• provide opportunities for staff and students to engage in research according to acceptable national and international standards.
• provide a mechanism for the administration of research grants and research consultancies.
• protect the intellectual property resulting from university-sponsored research.
• ensure the safety and well-being of research staff, human and animal subjects and experiments.
• facilitate the development of teaching, and critical enquiry and the furtherance of knowledge through research and the provision of research infrastructure.

The Research Policy was followed by the Intellectual Property (IP) Policy, which further contributed to the growing research and innovation management ecosystem. The IP Policy provides guidelines on the creation, use, protection, ownership and commercialization of intellectual property generated by research at the University (University of Technology, Jamaica Intellectual Property Policy, 2010). The policy emerged as the guiding instrument for the SGSRE’s provision of professional legal and IP protection services to staff.

The SGSRE has been designated “owner and driver” of the university’s strategic research-related initiatives, and is required to provide performance status reports on them at monthly meetings of the university’s executive management committee and ultimately the governing body, the Council. Supporting the work of the SGSRE are Graduate Studies, Research and Entrepreneurship Coordinators (GSRECs) serving as the critical link between the SGSRE and the various academic units within the university (University of Technology, Jamaica, Research Policy, 2009, p.3).
The SGSRE has conducted capacity building workshops for staff in grants proposal writing, began disseminating research findings to key stakeholders, and, very importantly, acted to build out and to operate a functional Research and Innovation Management (RIM) ecosystem within the institution.

The operational arms of the SGSRE are the Graduate Studies, Research and Entrepreneurship Units in each Faculty. These units were either already in operation or were to be established. A Graduate Studies, Research and Entrepreneurship Coordinator provides the link between each academic unit and the central SGSRE Office. Among the responsibilities of the GSRE Coordinator are to:

- Coordinate the work of the Faculty in the development of research foci, research teams and research portfolios and provide assistance for the creation of innovation from research.
- Participate in identifying the following activities:
  - funding for research;
  - opportunities for commissioned applied research;
  - creating opportunities for research training; and
  - marketing expertise within the Faculty for providing consultancy services.

The GSRE Coordinators are also responsible for monitoring and benchmarking research output as projects, publications and IP (Job Description, Faculty Graduate Studies, Research & Entrepreneurship Coordinator, University of Technology, Jamaica).

In its conceptualization, the SGSRE was intended to:

1. Provide linkages among Graduate Studies, Research and Entrepreneurship.
2. Vigorously promote industrial/professional graduate research degrees at both the master and doctoral levels.
3. Develop a formula for an equitable allocation of returns from income-generating research and consultancy ventures.
4. Lead inter-disciplinarity for research and consultancy among Graduate Studies Research and Entrepreneurship Units (GSREUs).
5. Organize a system of mentorship and pastoral care for graduate students.
7. Develop benchmarking of GSREUs research activities with respect to research planning, staff participation in research, graduate students, research income, research outcome, and research impact.

The University prides itself on fulfilling its objective as “The People’s University,”
dedicated to facilitating access to opportunities for learning and to meeting the
growth and development needs of Jamaica. Therefore, it is one of the ‘vehicles’ that
must contribute to the realization of Vision 2030, Jamaica’s first long-term National
Development Plan, which is aimed at the achievement of developed country status
by the year 2030. The plan is based on a comprehensive vision: “Jamaica, the place
of choice to live, work, raise families, and do business” (Planning Institute of
Jamaica, 2009).

Capacity-Building in Research and Innovation Management

To build the capacity of its own research and innovation management staff, the
University of Technology, Jamaica has engaged with the Global Research
Management Network, which is managed by the Association of Commonwealth
Universities (ACU) and is “dedicated to the development of international
collaboration amongst the research management community” (Research Global,
2010, p.3).

In 2009, the University of Technology, Jamaica became Caribbean partner on
the EU/ACP-funded Science and Technology project, *The Improvement of Research
and Innovation Management Capacity in Africa and the Caribbean for the Successful
Stimulation and Dissemination of Research Results* (RIMI4AC).

The RIMI4AC project, which ended in November 2013, was funded at €2.6
million under the Science and Technology Programme of the ACP with support
from the European Union. The specific objective of this project was to strengthen
the capacity of research institutions in the regions for sustainability, to effectively
manage research and innovation activities, and to improve dialogue between
researchers and policymakers, to inform evidence-based national and regional
policies feeding into the regional sustainable development agendas of the five
regions from which project partners were drawn.

Within the framework of the RIMI4AC project, a series of capacity-building
workshops and short courses were conducted, and resources were developed for
research managers of the partner institutions. Additionally, a major outcome for
Caribbean partners was the establishment and launch of the Caribbean Research
and Innovation Management Association (CabRIMA), in October 2010.

The mission of CabRIMA is “to support systematic improvement in the
effectiveness of research and innovation management systems, structures, and
processes in regional research & innovation institutions through capacity building
and effective networking” (Caribbean Research & Innovation Management
Association, 2013, p. 12). And its objectives are to:
1. Professionalize the research and innovation management profession in the region, raise the profile of regional Research and Innovation Managers, and identify training needs and provide opportunities for continuous professional development.
2. Provide a forum for networking, collaborative actions, and the transfer of know-how among Research and Innovation Managers of the region.
3. Develop mechanisms for Research and Innovation Managers of the region to benchmark their activities against best practices in the profession.
4. Stimulate research and innovation, and support the translation of research results into policies, practices and products beneficial to end-users.
5. Influence national and regional policies that will foster the regional sustainable development agenda of CARICOM member states.
6. Link regional Research and Innovation Managers with the Global Research Management Network.

The secretariat for CabRIMA is the School of Graduate Studies, Research and Entrepreneurship, at the University of Technology, Jamaica. Since its establishment, CabRIMA’s membership reflects the major higher education institutions and research organizations in Jamaica; for reasons of the geographical realities of the Caribbean Islands Pan-Caribbean membership has been restricted to members from The University of the West Indies. However, to treat with this challenge, CabRIMA has leveraged the power of the Internet to interact with its members.

Consistent with its mission and objectives, CabRIMA has spearheaded activities aimed at building the capacity of its members to more effectively perform their functions as research and innovation managers. As well as publishing a monthly Newsletter, workshop and seminars undertaken by the Association include the following:

1. “Grant Proposal Writing Fundamentals;”
2. “Making the most of international cooperation funding;”
6. “Formulating Effective Project Concept Notes;”
In addition to their participation on the RIMI4AC project, UTech, Jamaica’s Research Managers have participated in congresses of the International Network of Research Management Societies (INORMS).

UTech, Jamaica’s research managers have further built their capacity to more effectively perform their functions through involvement on other collaborative projects. So for example, with respect to intellectual property, for the period 2013–2016, the University was a partner on “Empowering knowledge transfer in the Caribbean through effective IPR & KT (IPICA) project at €697,392 under the Science and Technology Programme II of the ACP with support from the European Union” (IPICA Project Grant Application, 2013, p.2).

The overall objective of the IPICA Project was “to enhance the effectiveness of ST&I frameworks, and reinforce innovation capacities and regional cooperation in the Caribbean, with a view to empower the application of scientific knowledge for enhanced energy access & efficiency” (IPICA Project Grant Application, 2013, p.2). The IPICA project goal was to be realized through the achievement of the following specific objectives:

1. To enhance the effectiveness of ST&I frameworks, and reinforce innovation capacities and regional cooperation in the Caribbean, with a view to empower the application of scientific knowledge for enhanced energy access and efficiency.
2. To strengthen ST&I policy frameworks for enhanced use of scientific knowledge to solve societal challenges, through modernization of national and institutional intellectual property and knowledge transfer policies in four Caribbean countries and promoting region-wide impact.
3. To build knowledge transfer capacities and encourage cooperation culture among the innovation system stakeholders, through promoting support services and good practice projects for enhanced energy access and efficiency throughout the CA region (IPICA Project Grant Application, 2013).

Participation in the IPICA project also enabled UTech, Jamaica’s research managers to:

2. Take part in several train-the-trainer workshops on commercialization of innovation.
3. Collaboratively convene, with local project partners, two national forums with local stakeholders drawn from higher education institutions, research organizations, the government, and the private sector. From the forums,
UTech, Jamaica prepared a consolidated set of recommendations from the stakeholders on how to enhance the effectiveness of Jamaica’s intellectual property and knowledge transfer regime. These recommendations fed into a project White Paper, “Encouraging IPR & KT Good Practices in the Caribbean Region”, which was circulated to key stakeholders in Jamaica’s innovation system at the final International Project Conference in Kingston.

4. Host two capacity-building replication workshops for staff members, as well as research managers from higher education institutions and research organizations. The first replication workshop was held, under the theme “The Innovation Imperative: Knowledge Transfer as a Key Driver of Innovation”. The theme of the second workshop was “Capturing Value from Research Results.” These workshops were held in collaboration with the Jamaica Intellectual Property Office, The University of the West Indies (project partners), Bio-Tech R&D Institute, and the Planning Institute of Jamaica (PIOJ).

5. Anchor the development and implementation of an intellectual property quiz in three project partner countries – Jamaica, Trinidad and Tobago, and The Dominican Republic. The results indicated the need for greater efforts to increase awareness about intellectual property within the participating partner countries.

From their participation on the RIMI4AC project, engagement with the GRMN, and involvement on the other collaborative projects such as IPICA, research managers at UTech, Jamaica have self-reported gaining meaningful exposure, experience, and overall building of their research management capacity.

In keeping with the key functions of research management which Research Africa (2013) identified as falling within the scope of responsibilities of research managers and the mission and responsibilities of the University, the SGSRE provides a suite of research support services aimed at promoting and encouraging staff involvement in research; these include:

- research development fund, research impact, research ethics, President’s research award, research journal, research technology and innovation day, research information management, and embracing the scholarship of research management.

**Research Development Fund (RDF)**

**Internal Research Grant.** The SGSRE also manages a competitive, internal research grant fund – the research development fund (RDF). The RDF is an institutional
fund, which was originally established in 1998 to stimulate a research culture and build the University’s research capacity. The fund has been revised a number of times since its inception to respond to the growing needs of staff, and in keeping with the University’s research agenda.

As a publicly-funded institution, UTech, Jamaica operates in a financially-challenged environment. The provision for the research development fund has remained flat at $J10 million ($J1: US$134) per annum for several years until it was increased to $20 million in 2016. The university receives no specific research grant from the Government, and the country does not have a national research fund (as is the case in many other countries) from which competitive research grants can be obtained by its researchers.

The RDF provides funding for the following activities:

1. Research projects.
2. Publication fees for books, book chapters, and peer-reviewed journal papers.
3. Research capacity-building activities.
4. Protection of intellectual property.
7. Hosting of Conferences.
8. Research required to publish articles, book chapters, and books.

The fund is carved from the general income of the institution, which is predominantly made up of student fees and state subvention, and must compete with other pressing demands for budgetary support. This reality constrains research managers to ensure that the research development fund is strategically deployed to support research and scholarly activities that are relevant to economic and social problems of the Jamaican society while building the research capacity of the relatively new university.

Research Impact

This strategic deployment of the University’s modest Research Development Fund is a deliberate posture adopted to ensure that benefits accrue to proximate stakeholders of UTech, Jamaica, who Ivey et al. (2014) identified as the taxpayers of Jamaica. From this strategic use of the funds, there have been some impactful research projects.

Staines (2007) defined research impact as “the demonstrable contribution that
excellent research makes to society and the economy; research impact embraces all the diverse ways that research-related skills benefit individuals, organizations and nations” (p.14). In addition, Staines (2017) cited the following areas, referred to as “pathways to impact,” where evidence of the translation of research into impacts is usually manifested: (a) human capital, (b) business and commercial, (c) policy, and (d) quality of life.

With specific reference to all four of the above-mentioned “pathways to impact,” we now cite below examples of how the research development fund at UTech has been strategically used to support impactful research work of the institution. Highlighting these examples is consistent with one of the key functions of research managers, which is to highlight the extent and nature of their institution’s research work, ensuring the effective dissemination of research findings (Research Africa, 2013). The examples are:

1. HIV Drug Resistance Surveillance among Jamaican Men who have sex with Men
2. Do Healthy Foods Cost More than Less Healthy Options in Jamaica?
3. Modular LED Lighting System for Street Lighting
4. Should English be taught as a Second Language in Jamaican Schools?
5. Assessing possible mitigation measures to reduce dolphin-fisheries interactions in Jamaica
6. Feasibility Study on Allowing Tourists to be Accompanied by their Pet Dogs while Vacationing in Jamaica
7. The Role of Community-Based Organizations in Local Governance, Empowerment, and Development in Jamaica
8. Information and Communication Technology (ICT) for teaching hearing-impaired students the Caribbean Examinations Council (CXC) English Language in Jamaica
9. Examination of the transferability of English Language skills
10. Modification and evaluation of polymers obtained from cocoyam (Colocasia esculenta) and sweet potato (Ipomoea batatas) for application in paracetamol and clarithromycin solid dosage formulations
11. Non-Invasive Real-Time Kidney Function Monitor
12. Tribological and corrosion study of cutting tools used in agriculture

The School of Graduate Studies Research and Entrepreneurship has directly trained through a series of workshops approximately 150 members of University academic staff in grant writing. In addition, School staff has assisted scores of others in preparing project grants proposals. One of the most gratifying positive outcomes
has been the award of the largest research grant to date that the University of Technology has received. Shared with five partners with UTech, Ja as the Lead Partner, the research project, “The Application of Solar-Powered Polymer Electrolyte Membrane (PEM) Electrolysers for the Sustainable Production of Hydrogen Gas as Fuel for Domestic Cooking”, received €495,344 of EU-ACP research grant financing.

This research project, which was successfully completed, is consistent with Jamaica’s Energy Policy, aims to contribute to a reduction of Jamaica’s energy problem by sustainably producing hydrogen as an LPG substitute cooking gas at a lower cost for use by householders (Hydrogen Project Grant Application, 2011).

Research Ethics

Upholding research integrity requires adherence to ethical principles and guidelines in the conduct of research. Researchers in the university are therefore expected to demonstrate integrity, honesty and professionalism in the conduct of their research. Research ethics was first embedded in the activities of the Research Committee that was merged into the Graduate Studies, Research and Entrepreneurship Coordinators Committee.

In keeping with international guidelines and standards of ethical responsibility, the SGSRE established a University Research Ethics Committee (UREC) in 2009. The Committee consists of a Chair, a representative from each college/faculty, a legal expert and a representative from government agencies involved in research. The UREC has the mandate of training in research ethics throughout the University. Members have also engaged in research ethics training through the National Institutes of Health grant-funded project Caribbean Research Ethics Education Initiative offered by Clarkson University, USA in collaboration with St. George’s University, Grenada. The work of the UREC has enabled the University to become a recognized institution in research ethics within the Caribbean, having contributed, through its Chair, to the formulation of research ethics legislation for the region. It is also a member of the Caribbean Network of Research Ethics Committees (CANREC), and its Chair served on the Caribbean Public Health Agency Research Ethics Committee.

President’s Research Award

The SGSRE is the secretariat with responsibility for selecting annually the awardee for the President’s Research Award. The purpose of the award is to stimulate
research and scholarly activities by encouraging and supporting individuals who demonstrate exceptional ability through their scholarly activities, research publications, research income generation and grants secured, creative research activity and other research outputs.

**Research Journal**

In 2011, the SGSRE re-launched the University’s Journal of Arts Science and Technology (JAST), which publishes peer-reviewed papers in the areas covered by the three colleges, five faculties and 18 schools of the university. JAST is thus a medium through which staff members may publish the results of their research, alongside other researchers in other institutions and countries. The journal is circulated as an open access publication on multiple online platforms and in hardcopy, all costs being borne by the University.

**Research Technology and Innovation Day**

The SGSRE expanded and strengthened the University Research and Technology Day as a public showcase of research and innovation work and capacity at the University. Later rebranded as Research Technology and Innovation Day with the deliberate inclusion of “Innovation” in the name, the objectives of the event are to:

1. Showcase recent results of research activities undertaken by faculty members and students.
2. Demonstrate the facilities within the various units and other resources that are available to conduct research.
3. Highlight existing research collaborations between the university, academic, and industry partners.
4. Attract potential research partners from academia and industry.
5. Promote the university’s courses of study, especially graduate research degrees.

RTID provides an opportunity for the university to display its research work and capabilities to stakeholders. The event facilitates interaction between the university and its various publics. In so doing, the university not only showcases the research work of its researchers, which is of value to the society, but also seeks to develop strong linkages with industry, academia, and the government.

A particularly noteworthy aspect of RTID is its accompaniment by an annual publication compiled by the University’s research and innovation managers in
collaboration with the Corporate Communications Unit. These publications include:

1. A Pioneering Past and a Bright Future of Impactful Research and Scholarly Achievements
3. Research and Innovation: Initiatives, Engagements and Achievements
4. Structured Research Management Supporting Impactful Research
5. Strategic Use of the University’s Research Development Fund to Support Impactful Research.

Research Information Management

Another major undertaking of UTech, Jamaica’s research and innovation managers is research information management. In this regard, an up-to-date inventory of the institution’s research output is maintained by the SGSRE. The inventory lists published research work, comprising books, peer-reviewed journal papers, articles in periodicals, and presentations made at conferences by staff members.

The SGSRE also maintains an inventory of theses and dissertations completed by graduate students, as well as of patent applications.

The research information compiled by the SGSRE has enabled the University’s executive management to make informed decisions and report to the governing Council. In addition, academic managers are also enabled to make appropriate interventions.

Embracing the Scholarship of Research Management

In addition to performing their roles and functions, UTech, Jamaica’s research managers have also embraced the scholarship of the profession, by publishing articles in scholarly journals, as well as making presentations at conferences. Published papers and conference presentations include the following:


Reflections, Assessment, Limitations, Lessons Learned, and Next Steps

The School of Graduate Studies Research and Entrepreneurship (SGSRE) in 2017 completed its first decade as UTech, Jamaica’s research and innovation management office.

The Office of the School, at peak staffing, has had only 11 members of staff across its six functional areas, only five of them technical staff, and none of them a full-time research and innovation manager. Internal funding from the University
Budget for research support has averaged only J$10 million over the 10 years reviewed. With few exceptions, Graduate Studies Research and Entrepreneurship (GSRE) Coordinators have never been given the full-time appointment recommended. Academic staff, which have grown to 500+, are relatively research-inexperienced and unengaged. These and other constraints, notwithstanding, the University of Technology, Jamaica/School of Graduate Studies Research and Entrepreneurship has elaborated a functioning RIM ecosystem, has expanded and strengthened research and research and innovation management capacity and has achieved a growing a body of research projects.

Looking forward, both research and research and innovation management at UTech, Jamaica would greatly benefit from greater levels of resource support, including dedicated staffing for a serious RIM central unit and for Faculty units. The Research Development Fund has been doubled from J$10 million to J$20 million for the budget year 2017/2018, which still only represents J$40,000 for each of 500 academic staff. The University needs to more aggressively and skillfully pursue external grant financing, which requires better RIM staffing. Unlike many other countries, there is now no National Research Fund from which grants could be sourced, something for which UTech, Jamaica and its RIM staff have strongly advocated over the years. Grantors are nearly all external donor agencies (Henry, 2013; 2017).

In its first 10 years, the SGSRE has built RIM capacity through co-learning through collaboration, partnering on projects, and engaging with the global research management network. The University of Technology, Jamaica, has emerged as a leader in structured research management in Jamaica and the Caribbean. The university’s leadership in research and innovation management has contributed to the institution’s success in securing international grant funds, to growth in knowledge transfer through increasing consultancies, to increased research output, and improvement in the research ethics.

The School of Graduate Studies Research and Entrepreneurship is now the recognized research and innovation management unit in the University by both management and staff, and the Unit has demonstrated by its contributions that research and innovation management is a critical value-adding function within the University. The SGSRE, it is proposed, needs to be reorganized and strengthened, including adding additional technical staff, for greater effectiveness as the Unit traverses its second decade.

As a fledgling University, the strategic decision to establish an office with responsibility for research management (as distinct from research itself) yielded tangible benefits for the University of Technology, Jamaica. The authentic
experiences of research managers in a still relatively young University that are shared in this paper are important for leaders and research management practitioners, especially those in newly established or chartered Universities, in developing countries.

References


Caribbean Research & Innovation Management Association: Author.


Hydrogen Project Grant Application. (2011). *University of Technology, Jamaica*.


School of Graduate Studies, Research & Entrepreneurship, University of Technology, Jamaica. (2014). *Structured research management supporting impactful research*. Kingston: University of Technology, Jamaica.


An Evaluation of Health Information Management Policies and Procedures in Jamaica through the Lens of Leadership

NOLA P. HILL-BERRY
University of Technology, Jamaica

Abstract

Within the general health information management (HIM) practice, there are changing patterns and roles, and new and improved transactions (manual & electronic). In the academic institution responsible for the training of HIM practitioners in Jamaica, trainees are introduced to new HIM procedures in theory. Yet, for practical application of what they have learnt, trainees are introduced to and guided by archaic policies and procedures. Academic leaders have identified a gap – one that requires effective policy leadership to bridge through policy revision and development. This study examined the policies and procedures used to guide HIM in Jamaica; and sought to answer one main question which was: What policies and procedures are in place to guide HIM orientation, training and practice in Jamaica? Along with document review, a convergent-parallel mixed method approach was used to investigate HIM policies and procedures. The findings highlighted a number of issues mainly that the HIM practice in Jamaica suffers from the absence of relevant and current policies and procedures. Effective policy leadership is required to address the issues by spearheading the overhaul and development of appropriate policies; while ensuring transparency and standardisation in the HIM practice; and ensuring that HIM leadership and management take place within the confines of appropriate policies and procedures and a supporting legal framework.

Keywords: health information management, leadership, policies, procedures, Jamaica
Introduction

This paper is a component of a doctoral research that focused on leading health information management in Jamaica and was completed at the University of Huddersfield.

In any organisation, the outcome of its processes and initiatives – positive or negative – is attributed to its leadership. Leadership is, therefore, a crucial but challenging task. Considering the expectations of leadership, and cognisant that leaders are answerable for organisational outcomes, it is important to examine organisational processes through the lens of leadership.

Health information management (HIM) is an allied health discipline that requires having sound knowledge of the flow of HIM processes within the health care delivery system; and using health information to safeguard patient care continuity; advance the welfare of patients, health providers and health institutions; and support other activities to augment the health care delivery system (Huffman, 1994). The sensitive nature of health information makes the HIM discipline quite a duetous one. However, the HIM practice is dynamic with changing patterns and roles, and new HIM transactions (manual & electronic). It, therefore, requires appropriate policies to allow for transparency and standardisation of HIM processes.

In the academic institution that trains HIM practitioners in Jamaica, trainees are introduced to new HIM procedures in theory. However, in practical application in the HIM institutions, trainees are introduced to and guided by archaic policies and procedures. Academic leaders have identified a gap – one that must be bridged through effective policy leadership (Miller, 2016). Organisational policies are created to support decision making, ensure standardisation of processes, drive compliance with rules and regulations, fix responsibility, and improve accountability. Policies map the path that an organisation should take. When fitly used, they establish the boundaries in which organisations operate, provide directions concerning how the activities within organisations should be conducted, and help to augment organisational processes. Policies and procedures are critical to health information management. In addition to having appropriate policies and procedures in place, the effectiveness of HIM structures and systems is heavily dependent on leadership. Hence, it was important to interrogate this topic through the lens of leadership.

Leadership requires flexibility, but without policies and procedures, leadership lacks accountability and clarity. In Jamaica, a number of issues are affecting HIM
such as adopting electronic health data processes without the supporting legal framework; lack of standardisation in HIM procedures; and not having policy leadership. Through the lens of leadership, this study evaluated existing HIM policies and procedures in Jamaica’s public health institutions. It provided a glimpse into how these policies and procedures were being communicated to, and used by HIM practitioners, as well as the relevance and currency of these policies and procedures to the existing HIM practice.

**Statement of the Problem**

A general expectation of all organisations and disciplines is that their policies and procedures must be periodically reviewed to safeguard their effectiveness and relevance. These reviews reside with organisational leaders, experts in the field, and other relevant stakeholders; but this is not so of HIM in Jamaica as the existing policies and procedures are archaic and inadequate to guide the current practice. Consequently, the theoretical aspects of HIM training at times do not align with the practical aspects. Further, electronic health records and electronic health data processing are being pursued, but there is no legal framework to support such electronic health information processing. An appropriate question is, how and when are Jamaica’s HIM policies and procedures reviewed, and how are these processes led? This question stimulated an evaluation of the HIM policies and procedures in Jamaica.

**Purpose of the Study**

The purpose of this study was to identify solutions to HIM policy leadership problems especially those related to policies and procedures in organisations servicing HIM.

**Significance of the Study**

This study is intended to make a contribution to national and institutional policies in HIM in Jamaica regarding standardisation of HIM processes, and how HIM department heads should appropriately lead to achieving institutional and national goals. Regarding contribution to the practice of HIM in Jamaica, the study informs the importance of policies to guide HIM transactions and highlights the need for compliance with established procedures and policies.
Research Question

This study sought to answer this question: What policies and procedures are in place to guide HIM orientation, training and practice in Jamaica?

Delimitations and Limitations of the Study

This study was delimited to HIM practitioners in selected health institutions in Jamaica, policy leaders in the Ministry of Health, and academic leaders in the HIM training institution. This entailed individuals who were practicing and leading HIM as part of their job role; and those who through their jobs, were frequently engaged with HIM practitioners.

The main limitation of the study was the scarcity of literature (that was specific to the Jamaican context) that the researcher could have cited for support.

Literature Review

In order to properly position this study, it was necessary to explore literature around leadership, learning by doing, chaos theory, systems thinking, and HIM-related resources, including the policy and procedures manual in Jamaica. This included an evaluation of the policies and procedures that were in place to guide HIM orientation, training, and practice; and the leadership of these policies and procedures.

Leadership

According to Daft (2010), leadership is probably the most important factor contributing to organisational success. Leadership is dynamic, especially in today’s environment. Effective organisational leadership is usually high on most stakeholders’ agenda because the effectiveness of organisational processes, activities and transactions is often an outworking of leadership (Miller, 2013). Based on organisational changes and developing trends, new positions are being taken regarding how leadership should be cultivated, who should lead, and what processes require specific leadership attention. Making this distinction is important for leaders to appropriately interact with people to achieve organisational goals (Daft, 2010). However, a determinant of such goal achievement is learning leadership by participating in leadership (Nixon, 2003).
Learning by Doing

According to Keeton (1983), through learning by doing, people engage in experiences that help to broaden their awareness and association by engaging with objects, people, and practices. Learning by doing underscores the relationship between theory and practice. Keeton expanded that through practical experiences, learners are directly engaging and interacting with the phenomenon being studied, and those practical experiences result in more effective learning. As a result, the best learning is underpinned by experiential learning; and as Schank, Berman, and Macpherson (1999), penned, through doing, learning will be most effective and memorable.

Chaos Theory

Chaos theory teaches that systems may behave in spontaneous and unpredictable ways but such situations, organisational leadership and management work together by adhering to the organisation’s purpose and core values. Leadership that is done along with the chaos theory is easier to practice than it is to understand (Burns, 2002). Burns expanded that in chaotic systems, leadership is practised throughout the organisation because each individual is considered an agent with possible access to information that can be critical to the organisation’s processes. Koehler, Kress, and Miller (2014) suggested that in chaos theory, understanding of minor changes can eventually cause unexpected, major changes in an organisation. Chaos theory demonstrates that “long-term success is not ensured by the plan, but by sticking to the purpose and core values of the organization” (Burns, 2002, p. 50).

Systems Thinking

A focus on the purpose and core business of HIM organisations could be done from systems thinking standpoint. According to Laszlo (2012), systems thinking is a necessary tool to help us to recognise the challenges and boundaries in which we live, work, and learn. Several benefits are linked to systems thinking such as positioning the organisation, managing relationships, leading change, and managing people processes (Skarzauskiene, 2010). Systems thinking is considered to be practical at any time and can be used in any area of our lives; it could also be applied using different methods (Haines, 2016). “Systems thinking is critical to coordinating developments and taking advantage of growing strengths in different sectors of the organisation” (Krishnamurthy, 2013, p. 205). In addition, in this
complexed but interrelated information age, “governance policies and principles must be inspired by systems thinking” (p. 205).

HIM Policies and Procedures

Policies. According to Fuller (2007), organisational policies are important to ensure clarity, standardisation, equity, and consistent work quality. McWay (2014) defined policy as “a decision-making guide that establishes the parameters for taking action and meeting objectives [and] establishes boundaries or limitations on the direction the organisation will take in the future” (p. 326). Miller (2018) labelled policies as “roadmaps” giving “shape and structure” (p. 45) to the systems within an organisation; and the “fuel” and “roadmaps” that propel organisational processes, establish the boundaries in which to operate, and direct organisational activities (Miller, 2016). Polices should be inclusive and clearly stated, accord with related laws, and be comprehensive enough to reflect actual practice (Fuller, 2007), especially while leading HIM practitioners. Hence, contribution to policies is required from different stakeholders and should impact wider organisational processes. Fuller expanded that because policies may be used in lawsuits, they should be carefully developed to communicate standard organisational processes and guide employees’ actions. Therefore, organisations need to appropriately orient employees to their policies while developing employees’ skill sets (Mishra & Smyth, 2015).

Procedures. A procedure is “a series of interrelated steps that are documented and used to provide standardization to routine tasks or problems” (McWay, 2014, p. 326), ensure high-quality, desirable outcomes of organisational initiatives, and specify how work should be done and how policies should be applied (Fuller, 2007). HIM transactions require clearly outlined procedures, that once clearly communicated, practitioners, can appropriately engage by following these procedures. A learning-by-doing approach to implementing these procedures may be an effective strategy to ensure that HIM practitioners continue to interact with and adhere to established operating procedures in their department (Webb, 2006).

In Jamaica, the HIM policies and procedures are set out in the Procedures Manual – Health Records Services (Ministry of Health, 2002). However, relevant and current policies and procedures are needed to help “establish the overall context of [HIM institutions] and to provide a framework within and through which [these institutional] leaders perform their duties” (Miller, 2018, p. 20). HIM practitioners are equipped to contribute to policy development, and because of the key roles that HIM practitioners play, their expertise is advantageous to address policies and
procedures in information management processes, and they need to be leaders in such processes (Gibson, Abrams, & Crook, 2015).

Method

Using a convergent-parallel mixed methods approach, the research question was investigated through a survey and semi-structured interviews. Quantitative and qualitative data were collected and analysed separately, after which the results of both were compared to provide an interpretation (Creswell, 2014). This convergent-parallel mixed method design combined both approaches to provide for a better understanding of the research question than using either method alone (Creswell, 2014). The quantitative data were analysed using SPSS 22; while the qualitative data were analysed according to themes that emerged from the data. For the survey, of the 230 participants that the researcher targeted, 212 appropriately completed and returned questionnaires (n = 202); with a response rate of 88%. For the interviews, of the 14 individuals targeted, the researcher was successful in conducting 13 interviews; with a response rate of 93%.

Results

Participants’ demographic characteristics. Quantitative data were collected from HIM practitioners assigned to primary, secondary, and tertiary health care facilities throughout the four health regions in Jamaica – North-East (NERHA), South-East (SERHA), Southern (SRHA), and Western (WRHA). Participants’ demographic characteristics were: the health region where they worked, sex, age range, years in the HIM practice, and the staff complement in their institutions.

In Jamaica, the HIM profession is dominated by females, hence the percentage distribution of survey participants was 16% males and 84% females. Just above 17% of participants worked in primary care, and a little below 83% worked in secondary and tertiary health facilities. Table 1 outlines the percentage of participants in each type of health facility.

As shown in Figure 1, there was a spread of participants throughout the four health regions allowed for greater representativeness. The majority of participants (40%) were in SERHA, the largest health region. In addition, the largest health facilities are located within SERHA; hence the HIM staff complement is also highest in this health region.
These findings begin with the policies and procedures used to guide HIM orientation, training and practice in Jamaica, then into how these policies and procedures were communicated to the staff, through to whether these policies and procedures were relevant to the practice and up-to-date. Interview participants were each given a description that included their category and a number. For example, participants who worked in the HIM practice were described as Practice Leaders, those who worked in the academic institution were described as Academic Leaders, 

Table 1: Health facilities where survey participants worked

<table>
<thead>
<tr>
<th>Type of health facility</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 4 H/C</td>
<td>25</td>
<td>12.4</td>
</tr>
<tr>
<td>Type 5 H/C</td>
<td>10</td>
<td>5.0</td>
</tr>
<tr>
<td>Specialist Hospital</td>
<td>22</td>
<td>11.0</td>
</tr>
<tr>
<td>Type C Hospital</td>
<td>73</td>
<td>36.0</td>
</tr>
<tr>
<td>Type B Hospital</td>
<td>45</td>
<td>22.2</td>
</tr>
<tr>
<td>Type A Hospital</td>
<td>27</td>
<td>13.4</td>
</tr>
<tr>
<td>Total</td>
<td>202</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Hill-Berry (2019)

Figure 1: Percentage of participants in each health region

Source: Hill-Berry (2019)
and those from the head office of the Ministry of Health were described as Policy Leaders. Further, to distinguish each participant, a number was attached to each description and the participant’s sex stated. For example, Practice Leader 1, male.

**HIM Policies.** A majority of participants reported awareness of the policies regarding academic requirements for entry into the HIM profession. Since all survey participants have been through the employment process and were at the time of the survey practising in the HIM field, they all should have been aware. Hence, there is still a concern regarding the 23% who reportedly were unaware of such policies or who were indecisive.

As Figure 2 illustrates, participants’ responses concerning their “awareness of” and “orientation to” the policies used to guide HIM training were fairly consistent with a slightly higher percentage of responses being “aware of” than those who were “oriented to” these policies. Participants’ responses to their awareness of (Q4) and orientation to (Q5) the policies guiding the HIM practice differed slightly but were generally consistent except for one response where “awareness of” the policies was lower than “orientation to” those same policies which should have been the same or higher in the “awareness of” responses. The last two items (Q6 & Q7) addressed the relevance and currency of the procedures and policies to the current HIM practice.

**Figure 2:** Participants’ responses according to each item

![Graph showing participants' responses](image)

Source: Hill-Berry (2019)
Concerning whether the HIM procedures and policies were current and up-to-date, an alarming 46% were indecisive. Responses for these last four items (Q4–Q7) were challenging to understand because 65% of participants reported being aware of the procedures and policies used to guide the HIM practice, while 58% reported being oriented to these procedures and policies (Q5). Undoubtedly, individuals can have knowledge of policies and procedures without being oriented to them. However, with 65% of participants reported having knowledge of these procedures and policies, and 71% (6% more than those who reported being aware of them), reported that these procedures and policies were relevant to the HIM practice, more investigation is needed to unpack these results. As highlighted in Figure 2, affirmative responses to the first six items (Q1–Q6) were within the range of 55%–75%. Responses to the last item (Q7) concerning currency of the HIM policies were noticeably dissimilar with just about 37% in the affirmative.

To summarise the survey results, there was consistency in the responses to these Likert-type items, except for responses that addressed “awareness of” and “orientation to” the policies regarding HIM training, where a slightly higher percentage of participants reported being “aware of” than those who were “oriented to” those policies and procedures. The other inconsistency was identified in the responses to the seventh item (Q7), where a high of 46% was undecided about the currency of the HIM policies and procedures. These inconsistencies presented some challenges interpreting the results, but the interview data provided some clarity.

**Availability, relevance and currency of HIM Policies and Procedures.** A three-part question sought to determine the availability of established procedures and policies regarding HIM orientation, training, and practice; if there were policies and procedures, how they were communicated to the staff; as well as the relevance and currency of such policies and procedures to today’s HIM practice. Interviewees reported that general training policies were in place, but none that was specific to HIM training. Also, while there were no established policies and procedures for HIM orientation, there were policy manuals to guide the HIM practice. One interviewee reported being unaware of any specific policy regarding orientation (Practice Leader 2, male). Another said that in some HIM departments, there were documented orientation guidelines or specific HIM orientation programmes while in other departments, there was no specific documentation regarding HIM orientation. In the latter, the senior HIM staff used varying methods to orient and engage their staff. These responses underscored the need for standardisation of procedures, practices and guidelines.
Procedures are in place, but they lack standardisation . . . and I think that is where we are deficient. So we need some form of uniformity in processes and procedures. (Practice Leader 4, female)

Similar feedback was received from academic leaders who shared that HIM orientation was not standardised, and the process was left to the discretion of the senior HIM staff. Rather than following established guidelines, senior HIM practitioners used whatever methods they considered effective enough to communicate such processes to their new recruits. However,

There is the need for established orientation plans and workflow plans to be used during orientation. (Academic Leader 2, female)

With reference to the HIM practice:

There are policies in place but staff members in the Policy Unit can give more details regarding the content of these policies and how the information is shared with the staff. (Policy Leader 3, female)

With no established policy or procedure that was specific to HIM training, one interviewee reasoned the need for a change and public awareness regarding the HIM profession:

. . . The Ministry of Health’s web page or [the webpage for] any of the Regional Health Authorities . . . should inform people about the profession. Regarding the HIM practice . . . with so many changes in the profession since the existing procedures manual was developed over 15 years ago; it is now clearly inadequate to meet current needs. (Academic Leader 4, male)

These responses supported the point regarding the absence of established policies and procedures specific to HIM training and orientation. While established policies and procedures were available to guide the HIM practice, they were dated, rendering them inadequate, a matter that must be addressed from a policy leadership perspective.

Communicating HIM policies and procedures to the staff. HIM practice leaders were most suitably positioned to specify how the policies and procedures, were communicated to the staff. They reportedly communicated these policies and procedures to the staff in different ways:

For the first few days, new recruits have the manual to read through and ask supervisors any questions concerning it. While working, they can always seek clarification from supervisors. I ensure that all new staff know the manuals are always available. (Practice Leader 3, female)
In another instance:

*Staff members are instructed to read the manuals and make their notes . . . The supervisor will assess them on what they have read. Where there’s need for clarity, they can revisit the manual or ask the supervisor.* (Practice Leader 1, female)

Otherwise, the senior HIM staff made efforts to directly communicate the information to the staff during one-to-one conversations, internal training seminars, workshops, and staff meetings. In addition:

*We tell the staff that the manual is available and we encourage them to read it and inform themselves.* (Practice Leader 2, male)

*Each department has a copy of each manual and all the policies. The information is communicated to the staff through workshops.* (Practice Leader 6, female)

*In two ways: one, in writing, through the procedures manual and staff members’ job description; and two, orally by senior members of staff.* (Academic Leader 3, male)

Other interviewees said that the information was communicated to the staff in varied ways but mainly through training organised by the HIM unit within the Ministry of Health.

*Policy documents/ manuals are circulated to the relevant Regional Health Authorities, but policy information is mainly communicated through organised training sessions.* (Policy Leader 1, male)

*The information is communicated through training sessions, workshops and supervisory visits.* (Policy Leader 2, male)

In other instances, there was uncertainty regarding how HIM policies and procedures were communicated to the staff.

*I’m not sure . . . but I don’t think enough time is spent to properly communicate that information to the staff.* (Academic Leader 4, male)

As the data uncovered, multiple methods were employed to share HIM policies and procedures with the HIM staff, but there was no established method. This is another area requiring the attention of all three groups of leaders (practice, policy & academic).

**Relevance and currency of HIM policies and procedures.** Interviewees unanimously stated that established procedures and policy manuals were in place and that much of the content was relevant to the practice and was still being used.
However, written over 16 years ago (Ministry of Health, 2002), this manual does not address the new procedures in HIM; thus, it is inadequate to appropriately guide today’s HIM practice.

*We are in the technological age with so many new development, when we compare with our international partners; we are far behind. Our policies, procedures and systems should be revised to align with current practices, locally and internationally.* (Practice Leader 3, female)

*Several processes have changed . . . so we need to bring them [policies and procedures] up to date to address current processes.* (Practice Leader 5, female)

Appropriate policies are also needed to address inconsistencies in the practice.

*There is need for standardisation to ensure uniformity . . . some things in the manual are similar to what AHIMA and CHIMA are still doing. We just need standardisation across the regions. Our policies need improvement, and the relevant stakeholders should contribute to the process.* (Practice Leader 6, female)

Academic leaders all agreed that some of the information in the procedures manual was still relevant, but most of the information lacked currency; also, its inadequacy to guide the current HIM practice was highlighted:

*The practice . . . is gradually changing so . . . the manual should be updated to reflect manual and electronic processes.* (Academic Leader 2, female)

* . . . it was written years ago . . . It is inadequate because there are so many changes in the profession ...* (Academic Leader 4, male)

Others agreed:

*Though aspects are still relevant . . . , we recognise the need to update the information and align with current trends.* (Policy Leader 1, male)

*There are aspects that are still relevant, but it is in need of updates.* (Policy Leader 2, male)

Another interviewee vaguely expressed:

*They are currently in the review process.* (Policy Leader 3, female)

The interview data exposed the absence of established policies and procedures that were specific to HIM orientation and training. However, the available policies and procedures were only partially relevant, and the information was archaic. All
policy documents needed a complete revision to include both manual and electronic processes and to address current HIM needs.

In summary, responses from both data sets provided an understanding of the status of the HIM policies and procedures in Jamaica. Together, these results confirmed the absence of policies and procedures that were specific to HIM orientation and HIM training. While there were established policies and procedures for the HIM practice, they were dated. Also, there was no standardised way of sharing the content of HIM policies and procedures with the staff. These responses call for urgent engagements of all stakeholders to overhaul existing policies; to develop new ones that are appropriate to guide the current HIM practice; and to establish clearly documented guidelines for communicating such vital information to the staff.

**Discussion**

Leading and managing HIM requires having relevant, current, clear and comprehensive policies and procedures to effectively guide departmental processes and operations (Fuller, 2007; McWay, 2014). This discussion focuses on responses regarding the availability of HIM procedures and policies for training, orientation, and practice; how these were communicated to the staff; and the relevance and currency of such policies and procedures.

Two-thirds of survey participants reportedly were aware of the policies regarding HIM training and orientation, while a little below that figure were oriented to these policies. However, there were inconsistencies in the results of both data sets. As earlier noted, interview responses concurred with the 14% minority who reported being unaware of policies and procedures for both HIM training and orientation. From both data sets, responses regarding the availability of policies and procedures for the actual HIM practice were similar. While documented policies were in place to guide the HIM practice (Ministry of Health, 2002), there was a lack of established procedures and policies for HIM orientation; thus, there were no specific or standardised procedures for HIM orientation. This lack sometimes resulted in awkward situations. As Fuller (2007) advanced, policies and procedures are necessary tools to ensure clarity, equity, standardisation, and consistent work quality. To mitigate such chaos and confusion, policies should be clearly documented for HIM orientation, training and practice; to promote standardisation and improve orientation; and to allow for transparency in the practice.

Like “roadmaps” (Miller, 2016, p. 145), policies are needed to chart the HIM
path and to establish “the parameters for taking action and meeting objectives” (McWay, 2014, p. 326). HIM leaders must use appropriate policies to communicate standard organisational processes and guide their transactions. Since policies “establish boundaries or limitations on the direction the organisation will take in the future” (McWay, 2014, p. 326), aptly used, these policies could also help to standardise processes, increase employees’ performance levels and ultimately the organisation’s performance (Mishra & Smyth, 2015).

HIM leaders will need to synergise with academic and policy leaders, and other stakeholders to develop clear guidelines for orienting practitioners to the policies and procedures guiding their practice (Mishra & Smyth, 2015). This strategy would also ensure that HIM transactions are guided by a clear “series of interrelated steps . . . to provide standardisation to routine tasks or problems” (McWay, 2014, p. 326). In addition, the revision and establishment of appropriate policies and procedures would help to standardise work processes and specify how the related policies should be applied (Fuller, 2007). Procedures would, therefore, be harmonised with policies to mitigate chaos and meet organisational goals.

Since the “chaos theory teaches that long-term success is not ensured by the plan, but by sticking to the purpose and core values of the organisation” (Burns, 2002, p. 50), one could question whether the absence of appropriate policies and procedures was any indication that HIM organisations in Jamaica have embraced the chaos theory. But a suitable question to ponder is, how can an organisation stick to its purpose in the absence of clear policies and procedures? Koehler, Kress, and Miller (2014) suggested that in chaos theory, an understanding of minor changes can, in due course, cause unexpected, major changes in an organisation. Indeed, that is a possibility. But what if it does not happen that way? More seriously, what if those unexpected, major changes wane the organisation’s purpose and mission, or even create more chaos? Considering the essential and sensitive nature of HIM, organisations may benefit from only that aspect of the chaos theory that suggests that leadership is practised throughout the organisation as each individual can impact its processes (Burns, 2002). Such intent would lead HIM practitioners to seek after, use, and adhere to established policies and procedures to fulfill their organisation’s purpose and mission.

During the interviews, HIM practice leaders and policy leaders shared that the policies and procedures were communicated to practitioners in a number of ways, mainly during orientation. These results presented another concern because if these policies were the compasses of the practice, why would 35% of participants be unaware of the policies and procedures guiding their practice? Moreover, how could 42% not confirm whether they were oriented to these policies and procedures?
Once again, the results of the interview clarified that to a lesser extent, HIM policies and procedures were communicated during supervisory visits (Policy Leader 2, male). It appeared that enough was not being done to communicate these policies to the staff and because of this, some staff members were not oriented to, or even aware of the policies. This presented an undesirable situation requiring urgent attention from HIM practice leaders, and since policies drive compliance, policy leaders need to give attention here as well.

There was displeasure among some interviewees that not enough time was taken to appropriately communicate policies and procedures to the HIM staff. This unease was justified by the unreliable means by which HIM leaders reported sharing such vital information. One would expect mandatory interaction with the policies and procedures during initial orientation and periodic training sessions. Rather than having new recruits reading through manuals and responding to questions posed by the senior HIM staff, wouldn't having them use the information in practical situations be more purposeful and effective? The researcher found nothing in the literature to support communicating vital information via these unreliable means.

The stated methods of sharing information were comparable to theoretical classroom learning which Schatz (1997) warned that while these have their place, there is need for active engagement with the information through a learning-by-doing approach, such that learning will be both relevant and practical. Additionally, as Schank, Berman, and Macpherson (1999) advanced, interacting with the information in practical ways and engaging with the processes would have increased the likelihood of understanding and remembering these policies and procedures. Furthermore, learning these important policies should be practical; not just theoretical (Keeton, 1983). More importantly, HIM practice leaders and policy leaders must work synergistically to clearly and comprehensively communicate these policies and procedures to all HIM practitioners (Fuller, 2007).

From the survey responses, it appeared most of the HIM staff were either not familiar with the policies and procedures or practitioners were just not interacting with them enough to determine their relevance and currency. Also, there were slight contradictions in these results. Interviewees conveyed that the policies and procedures warranted revision to ensure standardisation of the HIM practice across all health region, and to align with current and changing HIM practices locally and internationally. This is another area that leadership and management need to give attention because if the “roadmaps” (Miller, 2016) are not current, how can they be effectively used to guide the HIM path?

If, according to the survey results, 65% of participants were aware of HIM
policies and procedures, how could it be that 71% of participants reported that these policies and procedures were relevant to the practice? Was it just a supposition for that additional 6% of participants? Were their responses based on other factors and not necessarily what they knew about the policies and procedures? By themselves, these results highlighted other discrepancies making them more challenging to analyse. Additionally, the current hybrid (paper-based & electronic) HIM environment warrants new policies and procedures to guide the practice; and these should be within the appropriate legal framework. All three categories of HIM leaders must acknowledge the ineffectiveness of available policies and procedures and synergise to ensure the availability, relevance, and currency of policies and procedures to stipulate how the work should be done; and to help ensure quality, consistency, modernisation and regularisation of HIM transactions (Fuller, 2007).

As earlier stated, the HIM department is the core of any health institution, and the roles of HIM practitioners are too sensitive to execute outside of an appropriate legal framework and without appropriate policies and procedures. To change this situation, HIM leaders must share ideas and draw on the experience and expertise of others (Fullan, 2004) within the HIM context and with related competencies. Additionally, through systems thinking, HIM organisations should ensure proper governance policies and principles for the advancement of the profession (Krishnamurthy, 2013).

In summary, HIM practitioners in Jamaica were operating without appropriate guides as the required policies and procedures were either absent, dated or lacking. With numerous changes in the HIM practice and new data needs, HIM leaders and managers need to lead a complete overhaul of the policies and procedures to align with current and developing trends nationally, regionally, and globally. In addition, they need to contribute to the development of a new legal framework to support electronic health information transactions. Addressing the range of issues identified requires effective policy leadership. While HIM practice, policy, and academic leaders must synergise to address the issues and effectively lead HIM, leading the HIM path in Jamaica can only be effective if the appropriate “roadmaps” are used (Miller, 2016).

**Implications**

The outcome of this evaluation has implications for policy leadership (Miller, 2016). This involves leading the development of appropriate policies, and leadership and management guided by policies and procedures for standardisation of HIM
practices. The situation earlier described, exposed HIM practitioners to perpetuated errors and put other parties at a disadvantage. In the absence of current policies and procedures, HIM practice leaders were at risk of mis-guiding their staff. This reflected negatively on the HIM policy leaders who should have been monitoring trends and developments in HIM, and engaging in upgrading and revising of policies and procedures to ensure consistency and standardisation within the practice. Furthermore, these dated policies and procedures negatively affected the work of HIM academic leaders and how HIM training was being conducted especially those aspects for which the trainees were exposed to new theory but being guided to undertake tasks using archaic procedures.

As Gibson, Abrams, and Crook (2015) advanced, HIM practitioners are equipped to contribute to policy development, and they need to be the leaders in such processes. In addition to policy development, they must lead within the contexts of departmental, organisational, and national policies. Thus, policy leadership would use the appropriate “fuel” and “roadmaps” (Miller, 2016) for charting a clear HIM path (McWay, 2014); and establishing the “overall context of [HIM institutions], to provide a framework within and through which [these policies] leaders perform their duties” (Miller, 2018, p. 20).

**Conclusion**

The HIM practice in Jamaica suffers from the absence of relevant and current policies and procedures; and the related legal framework. This study highlights the need for national and institutional HIM policies to propel standardisation of HIM transactions and to support transparency in related processes. More specifically, this study appeals for institutional policies regarding how HIM departments should train, orient, and develop HIM practitioners; and strategies/initiatives that may be implemented toward institutional effectiveness. Hence, the need for policy leadership to spearhead the overhaul and development of appropriate policies; and to garner relevant stakeholder input in these processes. Furthermore, policy leadership is needed to ensure that HIM leadership and management are guided by appropriate policies and procedures.
References


Laszlo, K. C. (2012). From systems thinking to systems being: The embodiment of evolutionary leadership. *Journal of Organisational Transformation & Social Change, 9*(2), 95–108. DOI:10.1386/jots.9.2.95_1


Knowledge, Attitudes and Practices of Citizens of West Green in St. James, Jamaica towards Risk Factors of Cardiovascular Diseases

ABUBAKAR GARBA USMAN
University of Technology, Jamaica

RENEISHA STEPHENSON, ANASTASIA GOODEN, THEON HINES, SHANIQUE MARTIN
Cornwall Regional Hospital

TASHIA CAMPBELL-HYATT
Falmouth Public General Hospital

Abstract

Cardiovascular diseases (CVDs) are currently at its peak in prevalence as it has been recorded that more persons die from CVDs annually than from any other causes; hence, CVDs are now recognized as the number one cause of deaths globally (Ferguson et al., 2011). In 2004, there was an estimate of 17.1 million deaths globally, with CVDs accounting for 29% of all deaths (Ferguson et al., 2011). This research aimed at exploring the knowledge, attitude and practices of citizens of West Green towards the risk factors of cardiovascular diseases (CVDs). A cross-sectional study was conducted in West Green, St. James, Jamaica, in which a total of 153 persons, aged 18–65 years, were selected through the use of convenience sampling. Each eligible and willing participant was administered a CVD risk factor knowledge, attitude and practice questionnaire, which consisted of 35 questions. Majority of respondents had fair knowledge (54.9%) and good practices (61.4%); however, most were classified as having a negative attitude (58.8%). Associations were identified between knowledge and educational level (p=.004), as well as, employment status of females and practices (p=.014). Perceived importance of screening and its frequency was also found to have a significant association (p=.044). Additionally, 95% of respondents with a family history of CVD, disclosed that this compelled them to make positive lifestyle changes towards their health. This study elucidates that there is a correlation between knowledge, attitude and practices...
towards CVD risk factors. However, further studies are needed to explore the range of other characteristics that determine knowledge, attitudes and practices, so that appropriate CVD preventative measures may be implemented.

**Keywords:** knowledge, attitude, practice, cardiovascular diseases

## Introduction

There has been an evident trend in the epidemiologic transition from communicable to non-communicable diseases, particularly, cardiovascular diseases (CVDs) which are accountable for approximately half of all deaths and are anticipated to be the world’s number one cause of death or disability by the year 2020 (Andsoy, Tastan, & Kopp, 2015). However, that prediction has come earlier than expected with cardiovascular diseases being revealed as the number one cause of death globally by the World Health Organization (WHO, 2017). It has been recorded that an estimated 17.7 million people died from CVDs in 2015, representing 31% of all global deaths. Of those deaths, an estimated 7.4 million were due to coronary heart disease and 6.7 million were due to stroke (WHO, 2017).

These findings led to the realization that cardiovascular diseases are becoming alarmingly prevalent worldwide: for instance, cardiovascular diseases are reported to be the leading cause of deaths in Turkey (Andsoy, Tastan, & Kopp, 2015) and is estimated to cause 46% of all mortalities in Kuwait (Awad & Al-Nafisi, 2014). In the United States, CVDs claimed 813,894 lives in 2007, and on average, it is reported that more than 2,200 Americans lose their lives to CVDs each day (Institute of Medicine of the National Academies, 2011). Furthermore, it is approximated that 610,000 people die from heart disease every year (that is 1 in every 4 deaths) (Centers for Disease Control and Prevention, 2017).

Regarding the Caribbean and South America, cardiovascular diseases are expected to be responsible for three times more deaths and disabilities by 2025 (Madu, 2014). These predictions include a near tripling of ischemic heart disease and stroke mortality in Latin American countries (Pramparo, Montano, Barcelo, Avezum, & Wilks, 2006). CVDs cause approximately one million deaths a year in Latin America (LA), thus becoming the leading cause of death in recent years (Seron, Lanas, & Lanas, 2014). It is also estimated that the number of deaths in the region as a result of CVDs will escalate in the near future. Furthermore, it is implied that this increase is attributed to the demographic, economic and social
changes observed in Latin America in recent years. Coronary heart disease and stroke cause 42.5% and 28.8%, respectively, of the CVD mortality in the region (Seron, Lanas, & Lanas, 2014). In addition, it is reported that within the Afro-Caribbean population there has been an epidemiologic transition, in which cardiovascular disease is currently ranked as the leading cause of death (Ferguson & Tulloch-Reid, Cardiovascular Disease Risk Factors in Blacks Living in the Caribbean, 2010).

The prevalence of cardiovascular disease in Jamaica is fueled by a rise in cardiovascular disease risk factors such as diabetes, hypertension, high cholesterol, inactivity, tobacco use, and obesity (Madu, 2014). As a result, in 2004 cardiovascular diseases accounted for four out of the five prominent causes of death in Jamaica; some of the prominent causes being: cerebrovascular disease, diabetes mellitus, ischaemic (coronary) heart disease, hypertensive disease or any other heart disease. In addition, a similar pattern was depicted in other member countries of the Caribbean Regional Epidemiology Centre (CAREC) (Ferguson et al., 2017).

Based on the evidence identified, it can be established that CVDs are increasing in prevalence, globally as well as regionally and nationally. CVDs are accountable for the majority of deaths worldwide, with coronary heart disease and stroke claiming most lives (WHO, 2017). This can be attributed to the fact that a larger percentage of individuals are developing risk factors associated with CVDs, thereby increasing their susceptibility. Hence, the study seeks to examine the relationship between knowledge, attitudes and practices in regards to risk factors associated with CVDs.

**Statement of the Problem**

Cardiovascular diseases (CVDs) are currently at its peak in prevalence as it has been recorded that more persons die from CVDs annually than from any other causes; hence, CVDs are now recognized as the number one cause of deaths globally (Ferguson et al., 2011). In 2004, there was an estimate of 17.1 million deaths globally, with CVDs accounting for 29% of all deaths (Ferguson et al., 2011). These statistics later increased in 2015, with 17.7 million deaths from CVD, representing 31% of all global deaths. Of these deaths in 2015, an estimated 7.4 million were due to coronary heart disease, and 6.7 million were due to stroke (WHO, 2017). CVDs, in congruence with global statistics, is also on the rise in Jamaica; the rising prevalence of cardiovascular disease in Jamaica is fueled in part by a rise in the prevalence of cardiovascular disease risk factors and its promoters like diabetes, hypertension, hyperlipidemia, inactivity, tobacco use, and obesity (Madu, 2014).
The prevalence of cardiovascular diseases among Jamaican citizens will continue to be a concern if necessary health interventions are not implemented by the governing authorities.

**Purpose of the Study**

The main purpose of this study is to explore the knowledge, attitudes and practices that citizens of West Green have towards the risk factors of cardiovascular diseases.

**Objectives**

1. To investigate how the level of awareness of cardiovascular disease risk factors influence an individual’s attitude and health practices.
2. To determine how perceived health risk impacts the lifestyle practices of individuals.
3. To examine how socio-demographic factors influence an individual’s practices in regards to cardiovascular disease prevention.

**Research Questions**

The overarching question is: What knowledge, attitudes and practices do citizens of West Green have towards the risk factors of cardiovascular diseases?

**Research Sub-Questions**

1. Does the level of awareness of cardiovascular disease risk factors impact an individual’s attitude and practices towards cardiovascular prevention?
2. How does an individual’s health belief influence his or her lifestyle practices in regards to cardiovascular disease risk factors?
3. How do socio-demographic factors influence an individual’s practices towards the prevention of cardiovascular diseases?

**Significance of the Study**

The findings of this study will be of value and importance to the general population, health authorities and the government, as CVDs are becoming alarmingly prevalent in Jamaica. If the findings of this study are published, it may increase the general public awareness of CVD risk factors which may consequently
impact their health behaviour. Additionally, the results of this study may prompt health authorities and the government, to develop and implement effective approaches geared at combating the rising prevalence of CVD and its risk factors. Also, the results of this study may influence the initiation of further research in this area of study.

Method

Research Design

A descriptive cross-sectional design was used to explore the knowledge, attitudes and practices of individuals, ages 18–65 years, towards CVD risk factors in the community of West Green. This design was used as it allowed researchers to collect data from a cross-section of participants with varied characteristics and demographics, in a timely and efficient manner.

Population

The target population for this study was 889 persons and encompassed citizens from the community of West Green, St James, between the ages of 18–65 years. However, the total population in this area is 1,100 (Statistical Institute of Jamaica, 2011).

Sample

The sample size for the proposed study was calculated by Raosoft Sample Size Calculator with a confidence level of 95% and a 5% margin of error, resulting in the total sample size of 269 from 889 persons. A convenience sample was used to select participants from the target population, as this technique allowed available persons to participate and is useful in documenting a particular phenomenon within a sample. However, only 153 persons chose to participate in the study, thereby resulting in a response rate of approximately 57%.

Data Collection

A structured questionnaire consisting of 35 items created by the researchers to assess the knowledge, attitudes and practices regarding CVD risk factors in the selected community was used as the data collection instrument. The questionnaire is
categorised into four distinct sections: section one has seven questions that ascertained demographic data; section two has nine questions that assessed knowledge; section three contains nine statements and one question that assessed participants' attitude and section four has nine practice-oriented questions. The data collection instrument was pre-tested on 10 persons in the selected age range to eliminate unclear questions and increase the effectiveness of the instrument in assessing participants.

The questionnaires were administered by the researchers to the participants within the community of West Green on the 10th and 17th of February, 2018. Data were collected at a central point and different intervals: such as in the morning, afternoon and evening, in order to include different individuals in the study, since persons may have different schedules. Participants were allowed 10 to 15 minutes to complete the questionnaire.

**Data Analysis**

The responses given by participants under each survey item were coded by researchers and entered into the SPSS version 20.0 software tool for statistical analysis. Questions for knowledge, attitude and practice were recoded, in order to generate scores for each. From the knowledge assessment section of the questionnaire, question eight, which is a multiple response question, contains seven risk factors of CVDs that were utilised in conjunction with seven other knowledge questions to generate total knowledge scores out of 14 for each participant and before classifying them as poor (0–5), fair (6–10) and good (11–14). Nine statements were used in generating attitude scores which were categorised as negative (0–4), and positive (5–9). The table in the practice assessment section was used to assess and formulate practices into good (4–6) and bad (0–3). Cross-tabular analyses and statistical tests of significance were utilized to determine a relationship between variables. Chi-square test and measures of associations were used to evaluate the significance of associations observed between variables. All data obtained from the different segments of the questionnaire were mainly analysed through the use of descriptive statistics and presented in the form of tables, graphs and charts.

**Ethical Considerations**

In doing this research, ethical issues were considered. Firstly, ethical approval to conduct this research was sought and obtained from the ethics committee of the University of Technology, Jamaica. A consent form was used which stated the
purpose of the study and soliciting an individual’s participation in the study. Additionally, participants were assured that their information will be confidential and anonymity maintained, as they were not expected to write their names on the questionnaire. Furthermore, participants were notified that completed questionnaires would be strictly guarded as they would be placed in envelopes, sealed, and stored in a secure filing cabinet only accessible to the researchers and research supervisor. Additionally, for analysis, data were stored and evaluated electronically by using the statistical package for the social sciences (SPSS) version 20 programme and the computer containing this programme was secured with a password known only by the research team. Furthermore, approximately two months after data analysis, the questionnaires were shredded.

Limitations of the Study

One of the limitations of this research was the size of the sample; only 153 individuals participated in the study out of the sample size of 269 that was Calculated by Raosoft Sample Size Calculator. With a higher number of respondents, the statistical power of tests would have increased and greater inferences could have been drawn from results. Additionally, a convenience sample was utilised to select participants which led to an imbalance in male to female ratio. Despite the limitations identified, the study is unique for the Jamaican population and results generated may be used to instigate further research in this field.

Delimitations of the Study

This research was conducted in the parish of St. James, and more specifically, the community of West Green, due to affordability and convenience. The study was also restricted to individuals within the age group 18–65 years, thereby excluding teenagers and older adults.

Results

The demographic data collected revealed that a majority of respondents were females, with 59.5%; and the minority being males with a percentage of 40.5%. A great number (34.6%) of respondents were noted to be in the age group of 18–26 years with the least number (14.4%) of respondents being aged 45–53 years. In regards to educational level, 47.1% of respondents attained a secondary level education, with the minority having no schooling completed. It was found that
73.9% of respondents were employed and 26.1% were unemployed (see Table 1). A significant association was found between gender and educational level with an impact of approximately 10% (derived from the contingency coefficient).

Table 1: Respondents’ Socio-Demographic Information

<table>
<thead>
<tr>
<th>Variable</th>
<th>(n)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>62</td>
<td>40.5</td>
</tr>
<tr>
<td>Female</td>
<td>91</td>
<td>59.5</td>
</tr>
<tr>
<td><strong>Age Group of Participants</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18–26 years</td>
<td>53</td>
<td>34.6</td>
</tr>
<tr>
<td>27–35 years</td>
<td>28</td>
<td>18.3</td>
</tr>
<tr>
<td>36–44 years</td>
<td>24</td>
<td>15.7</td>
</tr>
<tr>
<td>45–53 years</td>
<td>22</td>
<td>14.4</td>
</tr>
<tr>
<td>54–65 years</td>
<td>26</td>
<td>17.0</td>
</tr>
<tr>
<td><strong>Educational Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Schooling Completed</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Primary School</td>
<td>23</td>
<td>15.0</td>
</tr>
<tr>
<td>High School</td>
<td>72</td>
<td>47.1</td>
</tr>
<tr>
<td>Completed Associate Degree</td>
<td>34</td>
<td>22.2</td>
</tr>
<tr>
<td>Completed Bachelor’s Degree</td>
<td>18</td>
<td>11.8</td>
</tr>
<tr>
<td>Completed Post-Graduate Degree</td>
<td>4</td>
<td>2.6</td>
</tr>
<tr>
<td><strong>Employment Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>113</td>
<td>73.9</td>
</tr>
<tr>
<td>Unemployed</td>
<td>40</td>
<td>26.1</td>
</tr>
</tbody>
</table>

*Significant association noted between gender and educational level p<0.05 $\chi^2 (17.012)$, (df-5), Contingency coefficient .316
Assessment of Knowledge, Attitude and Practices

The main source of information on cardiovascular disease risk factors is the television (35.9%) and the least reported is radio (11.1%). Television was identified as the main source of information, by 38.2% of respondents aged 18–26 years. Whereas, 32.1% of respondents in the 45–53 age group received their cardiovascular disease risk factor information mainly from health workers. From the probability value generated, it was revealed that there is a significant association between the age group of respondents and their main source of information. Additionally, the age group is noted to impact the main source of information by 15% (derived from the contingency coefficient).

Table 2: Main Source of Information and Age Group Correlation

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Television</th>
<th>Radio</th>
<th>School</th>
<th>Health workers</th>
<th>Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18–26 years</td>
<td>38.2%</td>
<td>17.6%</td>
<td>46.9%</td>
<td>14.3%</td>
<td>47.6%</td>
<td>34.6%</td>
</tr>
<tr>
<td>27–35 years</td>
<td>20.0%</td>
<td>11.8%</td>
<td>18.8%</td>
<td>17.9%</td>
<td>19.0%</td>
<td>18.3%</td>
</tr>
<tr>
<td>36–44 years</td>
<td>10.9%</td>
<td>35.3%</td>
<td>18.8%</td>
<td>17.9%</td>
<td>4.8%</td>
<td>15.7%</td>
</tr>
<tr>
<td>45–53 years</td>
<td>9.1%</td>
<td>23.5%</td>
<td>3.1%</td>
<td>32.1%</td>
<td>14.3%</td>
<td>14.4%</td>
</tr>
<tr>
<td>54–65 years</td>
<td>21.8%</td>
<td>11.8%</td>
<td>12.5%</td>
<td>17.9%</td>
<td>14.3%</td>
<td>17.0%</td>
</tr>
<tr>
<td>Total</td>
<td>35.9%</td>
<td>11.1%</td>
<td>20.9%</td>
<td>18.30%</td>
<td>13.7%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

* Significant at p < 0.05, $\chi^2$ (27.239), (df-16), Contingency coefficient .389

Figure 1. Cardiovascular Disease (CVD) Risk Factors Chosen by Respondents
As shown in Figure 1, CVD risk factors that were identified by respondents. The unhealthy diet was the most identified risk factor selected by 16.6% of respondents, followed by lack of exercise with 15.4%. Hyperlipidaemia (high fat level) and Diabetes (high blood sugar) were the least recognised risk factors with 13.1% and 11.8%, respectively.

Table 3: Knowledge-Based Questions with Correct Answers, and Frequency of Correct and Incorrect Answers

<table>
<thead>
<tr>
<th>Knowledge-Based Questions</th>
<th>Correct Answer</th>
<th>Frequency Correct</th>
<th>Frequency Incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which of the following diseases is cardiovascular disease?</td>
<td>Stroke</td>
<td>121 (79.1%)</td>
<td>32 (20.9%)</td>
</tr>
<tr>
<td>Are vegetables high in cholesterol?</td>
<td>No</td>
<td>135 (88.2%)</td>
<td>18 (11.8%)</td>
</tr>
<tr>
<td>Which of the following actions can best lower the risk of developing heart disease?</td>
<td>Vigorous exercise</td>
<td>17 (11.1%)</td>
<td>136 (88.9%)</td>
</tr>
<tr>
<td>Do heart diseases only occur in the elderly?</td>
<td>No</td>
<td>148 (96.7%)</td>
<td>5 (3.3%)</td>
</tr>
<tr>
<td>Is there cholesterol that is good or bad?</td>
<td>Yes</td>
<td>47 (30.7%)</td>
<td>106 (69.3%)</td>
</tr>
<tr>
<td>Which meal is the healthiest?</td>
<td>Steamed Fish with vegetables and yam</td>
<td>148 (96.7%)</td>
<td>5 (3.3%)</td>
</tr>
<tr>
<td>Is rapid breathing the healthiest exercise for the heart?</td>
<td>No</td>
<td>91 (59.5%)</td>
<td>62 (40.5%)</td>
</tr>
</tbody>
</table>

(n=153)

From the questions asked, results revealed that 121 (79.1%) of the respondents were able to identify stroke as cardiovascular disease and 135 (88.2%) of the respondents correctly indicated that vegetables are not high in cholesterol. However, vigorous exercise was selected as the best activity to lower one’s risk of developing cardiovascular disease by only 17 (11.1%) of the respondents and 136 respondents answered incorrectly. A majority of the respondents (148) were aware that heart disease does not only occur in the elderly; however, five respondents were unaware of such. Additionally, a large number of respondents (106) were unaware that there is good and bad cholesterol; therefore, only 47 (30.7%) of the respondents chose
the correct answer. Furthermore, steamed fish with vegetables and yam was selected by 148 (96.7%) respondents as being the healthiest meal among the choices provided; and 91 (59.5%) were able to identify that rapid breathing is not the healthiest exercise for the heart, while 62 (40.5%) respondents were unable to answer the question correctly.

As shown in Table 4, a majority of the respondents (58.8%) had a negative attitude, while approximately 41% of the respondents were categorised as having a positive attitude. A predominant percentage of respondents had fair knowledge, with 33.3% and 21.6% displaying a negative and positive attitude, respectively. Additionally, of respondents with good knowledge, 23.5% had a negative attitude, and 18.3% had a positive attitude. There was no significant association noted between both variables, since a p-value > 0.05 was generated from Chi-square test.

Table 4: A Crosstabulation of Knowledge and Attitude Scores

<table>
<thead>
<tr>
<th>Knowledge Scores</th>
<th>Attitude Score</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0–4 (Negative)</td>
<td>5–9 (Positive)</td>
<td>Total</td>
</tr>
<tr>
<td>0–5 (Poor)</td>
<td>3 (2%)</td>
<td>2 (1.3%)</td>
<td>5 (3.3%)</td>
</tr>
<tr>
<td>6–10 (Fair)</td>
<td>51 (33.3%)</td>
<td>33 (21.6%)</td>
<td>84 (54.9%)</td>
</tr>
<tr>
<td>11–15 (Good)</td>
<td>36 (23.5%)</td>
<td>28 (18.3%)</td>
<td>64 (41.8%)</td>
</tr>
<tr>
<td>Total</td>
<td>90 (58.8%)</td>
<td>63 (41.2%)</td>
<td>153 (100)</td>
</tr>
</tbody>
</table>

Significance at p > 0.05, $\chi^2 (0.302)$, (df-2)

Table 5: Correlation between Knowledge and Practice

<table>
<thead>
<tr>
<th>Knowledge Scores</th>
<th>Practice Scores</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0–3 (Bad)</td>
<td>4–6 (Good)</td>
<td>Total</td>
</tr>
<tr>
<td>0–5 (Poor)</td>
<td>2 (40.0%)</td>
<td>3 (60%)</td>
<td>5 (100%)</td>
</tr>
<tr>
<td>6–10 (Fair)</td>
<td>31 (36.9%)</td>
<td>53 (63.1%)</td>
<td>84 (100%)</td>
</tr>
<tr>
<td>11–14 (Good)</td>
<td>36 (40.6%)</td>
<td>38 (59.4%)</td>
<td>64 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>59 (38.6%)</td>
<td>94 (61.4%)</td>
<td>153 (100)</td>
</tr>
</tbody>
</table>

Significance at p > 0.05, $\chi^2 (0.271)$, (df-2)
As shown in Table 5, more than half of the respondents who had good practice had fair knowledge. Also, 59.4% of respondents with good knowledge were also categorised as having good practices, and 40.6% were noted to have a bad practice. No significant association was found between knowledge and practice from the probability value generated.

Most respondents attained a secondary level education and of these respondents, 60.7% had a fair knowledge and 31.2% had good knowledge. Additionally, of the respondents with good knowledge of CVD risk factors, 50% had a post-secondary level education, and 18.8% had at least primary school education. A p-value of less than 0.05 was ascertained, revealing that there is a significant relationship between knowledge and educational level. Furthermore, it was noted that educational level impacts knowledge by nine percent (derived from the contingency coefficient).

Furthermore, the findings showed that a majority 64.3% of the female respondents had a fair knowledge of CVD risk factors. Of the respondents who received a good knowledge score, more than 50% were also females, whereas 45.3% were males.

Table 6: Relationship between Knowledge and Educational Level

<table>
<thead>
<tr>
<th>Educational Level</th>
<th>Knowledge Scores</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0–5 (Poor)</td>
<td>6–10 (Fair)</td>
<td>11–14 (Good)</td>
<td>Total</td>
</tr>
<tr>
<td>Primary School and Below</td>
<td>2 (40%)</td>
<td>11 (13.1%)</td>
<td>12 (18.8%)</td>
<td>25 (16.3%)</td>
</tr>
<tr>
<td>Secondary</td>
<td>1 (20%)</td>
<td>51 (60.7%)</td>
<td>20 (31.2%)</td>
<td>72 (47.1%)</td>
</tr>
<tr>
<td>Post-Secondary</td>
<td>2 (40%)</td>
<td>22 (26.2%)</td>
<td>32 (50%)</td>
<td>56 (36.6%)</td>
</tr>
<tr>
<td>Total</td>
<td>5 (100%)</td>
<td>84 (100%)</td>
<td>64 (100%)</td>
<td>153 (100%)</td>
</tr>
</tbody>
</table>

Significant at p < 0.05, $\chi^2$ (15.629), (df-4), Contingency coefficient - .304

Impact of Health Belief on Lifestyle Practices

The findings also showed that 58% and 65.3% of respondents who agreed and disagreed that their current lifestyle places them at risk, had good practices. Whereas, 42% of respondents who perceived that their current lifestyle put them at risk for heart disease had bad practices.
As shown in Table 7, a preponderance of respondents agreed that screening is important and of those respondents, 41.7% had screening more than twice a year, 32.6% once a year, 22% only when they are sick and the least number of respondents reported having no screening. In contrast, a smaller number of respondents disagreed on the importance of screening, with the majority doing screening either once a year or only when they are sick. A statistically significant association was noted between the perceived importance of screening and frequency of medical screening, with an impact of five percent derived from the contingency coefficient.

Persons with the family history of CVD was cross-tabulated with the question: “If you have a family history of heart disease, does this cause you to make positive lifestyle changes in regards to your health practices?” The results obtained revealed that 145 (95%) of respondents with a family history stated that having this characteristic has encouraged them to make positive lifestyle changes in regards to health practices. However, eight or five percent claimed that having such a characteristic does not influence them to make any positive lifestyle changes.

As shown in Figure 2, a predominant number of respondents (24.6%) selected “I don’t want to get sick”, as their main influence to health practices geared at preventing CVD. In contrast, the least number of respondents (5.8%) selected doing what they want because death is certain.

<table>
<thead>
<tr>
<th>Screening is Important</th>
<th>Once</th>
<th>More than twice a year</th>
<th>Only when I’m sick</th>
<th>Never</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>43 (32.6%)</td>
<td>55 (41.7%)</td>
<td>29 (22.0%)</td>
<td>5 (3.8%)</td>
<td>132 (100%)</td>
</tr>
<tr>
<td>Disagree</td>
<td>9 (42.9%)</td>
<td>3 (14.3%)</td>
<td>9 (42.9%)</td>
<td>–</td>
<td>21 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>52 (34.0%)</td>
<td>58 (37.9%)</td>
<td>38 (24.8%)</td>
<td>5 (3.8%)</td>
<td>153 (100%)</td>
</tr>
</tbody>
</table>

Significant at $p < 0.05$, $\chi^2 (8.125)$, (df-3), Contingency coefficient .225
Impact of Selected Socio-Demographic Variables on Practices

In Table 8, it was revealed that 54.5% of employed males within the 18–26 age group had bad practices, which was notably higher when compared to males of the other age groups. Employed males within the age groups 18–26 years and 54–65 years had equal percentage scores for good practices (26.9%), which was also the highest among age groups in that category. On the other hand, employed female respondents within the age group of 36–44 years reported more bad practices than female respondents in the other age groups. Additionally, employed females within the age group of 45–53 years demonstrated better practice (27.5%) in comparison to the other age groups. It was unveiled that a majority of unemployed respondents, both males and females, within the 18–26 age group, had bad practices. However, an equal percentage of 31.6% of unemployed females within the age group of 18–26 years and 54–65 years were noted to have good practice. A weak but significant association was found between employed females and practices with an impact of 16% as derived from the contingency coefficient.

Discussion

In this cross-sectional study, knowledge, attitude, and practice were examined with regards to CVD risk factors among citizens in West Green, St. James, Jamaica. Results indicated that the majority of respondents’ had a fair knowledge and good
practices, however, most were classified as having a negative attitude. Interestingly, associations were identified between knowledge and educational level, as well as the employment status of females and practices. It was also observed that CVD risk was overestimated by more than 50% of the respondents with good practice scores and 95% of the respondents who have a family history of CVD, disclosed that this compelled them to make positive lifestyle changes. Additionally, a significant association was found between the perceived importance of screening and its frequency, with more respondents who acknowledged its importance having it done.

A majority of respondents from all age groups selected television as their main source of information about CVD risk factors. This finding was similar to the study

**Table 8: The Relationship between Selected Socio-Demographic Variables and Practices**

<table>
<thead>
<tr>
<th>Status/Gender</th>
<th>Practice Scores</th>
<th>Age Group of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0–3 (Bad)</td>
<td>18–26 yrs</td>
</tr>
<tr>
<td>Employed Male</td>
<td>12 (54.5%)</td>
<td>5 (22.7%)</td>
</tr>
<tr>
<td></td>
<td>7 (26.9%)</td>
<td>6 (23.1%)</td>
</tr>
<tr>
<td>Female 0–3 Bad</td>
<td>8 (32%)</td>
<td>5 (20%)</td>
</tr>
<tr>
<td></td>
<td>9 (22.5%)</td>
<td>8 (20%)</td>
</tr>
<tr>
<td>Employed Male 4–6 Good</td>
<td>4 (80%)</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>3 (33.3%)</td>
<td>2 (22.2%)</td>
</tr>
<tr>
<td>Female 0–3 Bad</td>
<td>4 (57.1%)</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>6 (31.6%)</td>
<td>2 (10.5%)</td>
</tr>
</tbody>
</table>
| **Employed females: significance at p< 0.05 \(\chi^2 (12.453), (df-4),\) contingency coefficient .401**

**Table 8: The Relationship between Selected Socio-Demographic Variables and Practices**
by Mazloomy et al. (2014), in which television was also identified as the main source of cardiovascular disease information. The researchers concluded that enlightening people through mass media campaigns, proved to be highly effective, especially television, as more persons from all age groups mostly utilize this medium (Mazloomy et al., 2014). Remarkably, a significant correlation was noted between the main source of information and age group ($p=0.039$) with an impact of 15%. Essentially, this means that age group may determine the source from which individuals receive their information about CVD risk factors, as 15% of the sources of information used by respondents can be explained by age group. This is shown in Table 2, where it is observed that younger persons gain more information about CVD risk factors from school, whereas older persons gain more information from health workers. Therefore, the age group may assist in the selection of appropriate and effective media for CVD information dissemination to persons from different age groups.

**Knowledge Assessment**

Regarding the identification of CVD risk factors, unhealthy diet and lack of exercise were selected by the majority of respondents, whereas, smoking and excessive alcohol intake, hyperlipidemia and diabetes were the least selected. These results differed greatly with results obtained in the study by Mirza et al. (2016), in which it was found that the majority of respondents recognized hypertension (51.4%), hyperlipidemia (51.4%) and smoking (52.7%) as possible risk factors for CVD. However, it was revealed that fewer respondents recognized physical inactivity (28.4%) or family history (30.6%) as possible risk factors for CVD (Mirza et al., 2016). Although the results of this study differ slightly from those in the study by Mirza et al. (2016), they appear to corroborate with results identified in the research by Vaidya (2013), in which more respondents identified behavioural factors (such as lack of exercise) more than physiological causes (such as hyperlipidemia). These findings could suggest that more information is given on behavioural risk factors of CVD, than the physiological risk factors.

A preponderance of respondents (79.1%) identified stroke as cardiovascular disease, while a minute number selected diabetes and to a lesser extent Asthma. Majority of Jamaicans are affected by stroke, whether directly or indirectly, as stroke, is reportedly responsible for approximately 2,474 total deaths in a year (WHO, 2017). Hence, this may be the reason why a large number of respondents correctly selected stroke as a CVD instead of other well-known conditions. Additionally, respondents were cognizant that vegetables do not contain cholesterol.
However, the majority were unable to identify the existence of good and bad cholesterol. A reason for this is suggested in a research conducted by Goldman et al. (2006), where it was highlighted that respondents were confused about cholesterol being good and bad, as they were more familiar with the general term “cholesterol” and recognised it as unhealthy. Thus, it can be inferred that with more emphasis commonly placed on bad cholesterol, a limited number of respondents were aware that there is good cholesterol.

Likewise, it is interesting to note that less than a third of the respondents correctly chose that vigorous exercise is the best exercise to lower heart disease risk among the choices of gardening, walking and resting. This may be due to the fact that respondents engage mostly in walking and gardening, and thus may have selected those answers due to familiarity. However, the American Heart Association (2018), recommends vigorous exercise for at least 25 minutes, three days per week, to assist in preventing CVDs. In addition, results obtained in this study revealed that a remarkable number of respondents were mindful, that heart disease does not only occur in the elderly, thus implying awareness. On the contrary, Ibrahim et al. (2016), in their study, discovered that majority of Malaysian Public University students believed that CVDs only occur in the elderly, despite an increase in CVD and its risk factors in younger persons in the population (Ibrahim, Rahman, Rahman, & Haque, 2016). Ibrahim et al. (2016) proposed that this perception may be due to a lack of awareness and inferred that with increased awareness, this could be eliminated.

Impact of Knowledge on Attitude and Practice

Although approximately 55% of respondents had a fair knowledge of cardiovascular disease and its risk factors, the majority of these respondents demonstrated a negative attitude. Of the respondents with a negative attitude, a predominant number were categorised as having good and fair knowledge which may suggest that other factors (aside from knowledge) may have played an influential role in their attitude toward CVD risk factors. This finding was supported in the study by Vaidya et al. (2013), which highlighted that an increase in the level of knowledge was shown to corroborate with a decrease in satisfactory attitude from 20.3% to 14.7%. In contrast, research conducted by Abedi et al. (2009) discovered that 87.8% of subjects had good knowledge about CVD risk factors; however, their attitude was said to be poor. This substantiates findings in this study as it suggests that knowledge may not have a significant impact on an individuals’ attitude towards CVD risk factors. In addition, no significant association was noted between
knowledge and attitude \( (p>0.05) \), further indicating, that having good knowledge of CVD does not necessarily translate into a positive attitude. Therefore, further research needs to be done in order to explore all the elements that may contribute to a negative attitude as it relates to CVD and its risk factors.

Conversely, with regards to practice, more than half of the respondents who had good practice had fair knowledge. In a study done on patients with metabolic syndrome in an Urban Tertiary Care Institute in Sri Lanka, it was found that knowledge had an impact on practice as participants with high practice scores had significantly lower body mass index and waist circumference, which signified that better knowledge and practices are associated with a decrease in CVD risk markers (Amarasekara, Silva, & Senarath, 2016). Another study conducted by Yahya, Muhamad and Yusoff (2012), found that for every one unit increase in knowledge score, there will be a 0.1 increase in practice score on CVD among women. In addition, Yahya and company (2012) suggested that to improve CVD knowledge prevention in the population which was studied; there needs to be CVD education in the population first. Similarly, in this study, knowledge is noted to impact the practices of respondents despite no significant association between the two variables \( (p > 0.05) \). This finding is substantiated by Reeder et al. (2017) in their study on the effect of nursing education on CVD risk factor awareness. A pre-test was done to assess participants, followed by educational intervention and post-tests; the post-tests indicated an increase in awareness of CVD risk factors, as well as, an improvement in practices (Reeder, Childs, Gibson, Williams, & Williams, 2017). These improvements, according to Reeder et al (2017), may be attributed to the educational intervention done prior to the post-test; thus showing that educational intervention may increase CVD awareness and possibly influence an individual’s practices. On the other hand, Egbe et al. (2016) highlighted that awareness of health hazards associated with smoking, did not deter the smokers’ practice as it was inferred that respondents perceived health effects as long-term and not of immediate concern (Egbe, Petersen, & Meyer-Weitz, 2016). In essence, it can be implied that educational intervention is necessary in order to increase the awareness and subsequent practices of individuals towards CVD prevention. This, however, will only be effective if individuals perceive the importance of CVD preventative actions.

**Knowledge and Educational Level**

There was a significant association found between knowledge and educational level with indications that nine percent of the knowledge of CVD risk factors can be
explained by educational level. This finding is further illustrated by the trends identified in Table 6, where it was noted that respondents with fair and good knowledge scores had mainly secondary and post-secondary education, with the majority of post-secondary level respondents attaining the highest percentage of good knowledge scores. These findings are consistent with a previous study conducted by Vaidya et al. (2013) which revealed that persons with higher education level had better knowledge, attitude and practice scores than those with lower-level education (Vaidya, Aryal, & Krettek, 2013). Additionally, the findings of this study correspond with the results obtained from the research by Tovar and Clark (2013), in which participants with below secondary level education were noted to have lower knowledge scores than other education groups. Furthermore, Mazloomy et al. (2014) in their study, discovered a significant difference between the knowledge, attitude and practices of participants and their level of education, as well as, highlighted that participants possessing an associate degree, scored the highest in all areas (Mazloomy, et al., 2014). This, therefore, reiterates that educational level has a significant impact on knowledge.

Knowledge and Gender

From the comparison of gender and knowledge, a marked observation emerged which disclosed that females represented the majority of respondents with good and fair knowledge. The same trend is described in the study by Yadav and Wagle (2012), where it was found that females usually have significantly higher knowledge scores than males. This finding is further validated by Kulkayeva et al. (2012), whose study disclosed that females were more educated than males and therefore had better CVD risk factor knowledge. On the other hand, the research by Mirza et al. (2016), conveyed that males (68%) demonstrated better knowledge regarding coronary artery disease prevention strategies in comparison to females (32%). Contrary to the studies by Kulkayeva et al. (2012) and Yadav and Wagle (2012), the study by Akintunde (2015) revealed that participants’ gender and level of education did not significantly affect their level of knowledge about CVD risk factors. Hence, with all results considered, it is suggested that educational level and gender may or may not influence the knowledge of an individual.

Influences of Practices

Regarding influences of practices, approximately 25% of respondents indicated that their main influence was “I don’t want to get sick”, followed by enjoying healthy
eating and exercising. On the contrary, eight percent of respondents indicated that having no time affected practices and 5.8% alarmingly reported that they “do what they want because death is certain”. The study by Mirza et al. (2016) contradicts the findings in this study as it relates to healthy eating, as approximately 47% of the respondents were of the belief that food consumption should not be restricted. Mirza et al. (2016) suggested that this may have been as a result of unhealthy foods being more accessible to poorer populations. This inference expressed by Mirza et al. (2016) may explain why approximately 12% of respondents indicated an inability to afford a healthy lifestyle as their major influential barrier to cardiovascular health practices.

Family History’s Impact on Practices

Remarkably, it was revealed that 95% of respondents with a family history of CVD indicated that having this history has encouraged them to make positive lifestyle changes. Similarly, in the study by Zlot et al. (2010), it was shown that 42.2% of respondents who had a positive family history of CVD reported to have started making lifestyle changes such as having a personal doctor to do annual screening, as well as, changing their diet and exercising to improve their lifestyle. In comparison, 25.7% refrained from making changes despite being knowledgeable about their family history (Zlot, Valdez, Han, Silvey, & Leman, 2010). Based on the findings presented in this study, as well as that of Zlot et al. (2010), it is implied that family history may instigate positive lifestyle changes in those individuals who are at risk. Therefore, it is imperative that individuals become aware of their family’s health history as this may possibly influence them to make appropriate lifestyle changes to combat not only CVDs but other non-communicable diseases as well.

The Effect of Perception on Practices

Results obtained from the study revealed that respondents, both who agreed and disagreed that their lifestyle practices place them at risk for CVDs, had a greater percentage of respondents having good practices than bad practices. This suggests that some respondents have a good perception of their lifestyle risk, as a majority who disagreed that they were at risk (65%) had good practices. On the other hand, some respondents’ risk perception did not relate to their practices, as it was found that 58% of persons who had good practice scores overestimated their risk for CVDs while, 35% of respondents, with bad practice scores, underestimated their risk for CVDs. This finding may be explained by investigations conducted on the perceived
risk of CVD versus actual calculated risk, which showed that 29% of respondents who were at medium-high risk of CVD underestimated their risk, whereas 48% of low-risk respondents overestimated their risk (Webster & Heeley, 2010). Furthermore, the study suggested that high educational level and the presence of typical cardiovascular risk factors such as obesity and high blood pressure were shown to increase the accuracy of estimated risk. Whereas, increased age and being of the male gender has led to a decreased accuracy in the estimation of risk (Webster & Heeley, 2010). Therefore, more research needs to be done to identify the causative factors for over and underestimation of CVD risk in this population.

According to the results acquired from this study, health belief profoundly impacts respondents health practices, as a significant association ($p < 0.05$) was noted between the perceived importance of screening and its frequency. A significant association, as well as, a five percent impact was noted between the perceived importance of screening and its frequency. This five percent impact means that screening activity can be attributed to respondents’ perception of its importance. This observation is supported by the fact that approximately 86% of respondents who agreed that screening is important, performed more screening in a given year than those who did not perceive the benefit of this activity. A similarity with these results was identified in a study done on cardiovascular disease knowledge, attitude and practice in a rural Nigerian community, where researchers discovered that 16.7% of respondents believed that screening is not needed once a person is not symptomatically ill and 10.4% of respondents who never had screening done, believed that it was not necessary (Oguoma, Nwose, & Bwititi, 2014). Also, research by Mohammed (2012) showed that only five percent of the respondents visited health care facilities for a medical check-up, although they were knowledgeable of CVD risk factors (Mohammed J., 2012). Hence, it is suggested that an individual’s perception of the importance of a health action (in this case screening) possibly influences how often he or she performs this activity.

**Employment Status and Practices**

As it relates to employment status, there was a significant association observed between employed females and practices ($p < 0.05$), with employment status impacting the practices of females by 16%. This may suggest that employment may predict if an individual’s practice will be good or bad. As shown in Table 8, a higher percentage of employed females acquired good practice scores when compared to unemployed females. Hence, it is likely that employment status influenced these results obtained. No significant correlation was noted between males and
employment status; however, a trend was noted in that, a great number of employed and unemployed males, especially those in the age group of 18–26 years had bad practices. These findings are substantiated by a previous study conducted by Gupta et al. (2012), which revealed that employed and unemployed individuals of younger age groups had bad practices, as they tend to gravitate to unhealthy lifestyle choices. The study by Phillips and Klein (2010) further suggested why employment status may impact practices, as they expressed that individuals of low income may not be able to afford the healthy food or pay for health care services. These results support findings regarding influences to practices (Figure 3), in which approximately 12% of respondents stated affordability as a barrier to attaining a healthy lifestyle. Additionally, Patel et al. (2014) stated that the barrier(s) to behaviour change is not that CVDs are viewed as unpreventable, but rather socioeconomic issues. The study also suggests that low socioeconomic status contributes to psychological stress as individuals work hard to provide for their families, thereby leaving little time for healthy preventative behaviours (Patel, 2014). Hence, it can be implied that socioeconomic status, and in this case, employment, may hinder individuals from engaging in good practices due to insufficient time.

Conclusion

It is important to recognise that in order to combat the rising prevalence of CVDs in Jamaica, the knowledge, attitudes and practices of citizens towards its risk factors must be thoroughly examined as these variables impact each other. It is remarkable to note that knowledge is significantly associated with educational level and trends were noted in its correlation to gender, in which a majority of the respondents with good knowledge had post-secondary level education and were females. Those with fair and good knowledge possessed a negative attitude, thus reflecting the possibility that attitude is not solely dependent on knowledge. It was also found that employment status, family history of CVD, as well, as an individual’s health belief and perception greatly influenced practices. Therefore, to prevent CVD, gaps in knowledge, attitude and practices towards it risk factors must be appropriately addressed, and necessary interventions must be made.

Recommendations

1. Since it has been identified that most people garner information regarding CVD risk factors through the use of television, it is encouraged that more programmes are aired to increase awareness through this medium.
2. Knowledge, attitude and practice towards CVD risk factors among citizens can be improved through empowerment by health promotion, lifestyle modification and prevention programmes. This can be achieved through campaigns and seminars designed to increase CVD awareness.

3. It is imperative that health care workers reinforce the knowledge and practices required to prevent the development of CVD, as well as assess attitude based on the knowledge of CVD among the citizens and intervene appropriately.

4. There should be campaigns specially designed to improve the knowledge and practices of males as it relates to CVDs since the study highlighted that males had less knowledge and more bad practices in comparison to females.

5. More research needs to be done to identify why individuals may over or underestimate their CVD risk, as this may further lead to the understanding of CVD development.

References


American Heart Association. (2018). American Heart Association recommendations for physical activity in adults. www.heart.org/HEARTORG/HealthyLiving/PhysicalActivity/FitnessBasics/American-Heart-Association-Recommendations-for-Physical-Activity-Adults_UCM_307976_Article.jsp#mainContent


Perception of Parents to Immunize their Children

RACQUEL BURTON-EDWARDS, CHRISTINE JACKSON, ANTOINETTE JACKSON, INDIANA McLEOD, JUDITH MENDEZ, STACIAN WALKER
University of Technology, Jamaica

Abstract

Immunization is widely considered one of the greatest medical achievements of modern civilization; as a result, the Extended Programme The immunization regulation of 1986 drafted under the Public Health Act of 1974, states that all children in Jamaica are required to be adequately vaccinated by their first birthday to enhance their immune system (Russell, 2012). This study aims to ascertain the perceptions of parents about immunizing their children; and determine the factors that contribute to non-immunization of children. A cross-sectional design was used. A total of 50 parents/guardian with children of zero to six years old were invited to participate. Data were collected by the use of a questionnaire. Data were processed using the software Statistical Package for Social Science, version 22. Descriptive statistics were used for the analysis. The results showed that most of the participants were female over the age of 30, and were single. Their highest level of education was skill certification. Over 90% of their children had up-date vaccination. The results showed that there was an association between dependent variables (knowledge & reasons for immunizing their child) and independent ones (parents' demographics). All the respondents admitted that immunization is necessary, and they gathered information about immunization mostly from physicians, nurses and health care providers. Over 74% of the respondents agreed that vaccination prevented diseases in children; 64% believed they had sufficient knowledge about immunization. Their most pressing concern was the safety of the vaccines, and they wanted to know more about the benefits and risks. Over 88% of the respondents did not believe that there were any difficulties experienced by the parents to immunizing their child/children, while 12% believed. Despite some parents having concerns about the safety of vaccination, 92% of children were up to date with their immunization.

Keywords: immunization, vaccine, perception, parents, guardian, children
Introduction

Immunization is the process by which vaccines stimulate the body’s own immune system to protect the person against subsequent infections or diseases (World Health Organisation, [WHO], 2016). According to Russell (2012), immunization is widely considered one of the greatest medical achievements of modern civilization. As a result, the Extended Programme Immunization (EPI) was established in Jamaica, September 1977. This was so that many young Jamaicans could be awarded the opportunity to enjoy a disease-free childhood. The immunization regulation of 1986 drafted under the Public Health Act of 1974 states that all children in Jamaica are required to be adequately vaccinated by their first birthday to enhance their immune system (Russell, 2012).

The research topic perception of parents to immunize their children was chosen to outline the benefits immunization offers and the possible outlook of parents. One such benefit is to minimize children from becoming susceptible to infections and diseases. It also helps to minimize the financial burden on the economy and reduce disabilities and mortality rate. Vaccines must be administered to enough children in each area. Children are our future generation, and they must be protected against infections and diseases, thus setting a trend health-wise to promote immunization as it is very beneficial to the child and other members in the society.

Research Problem

The importance of immunizing young children is to prevent them from being susceptible to infections and diseases. The immunization target of 95% is not being met. Some parents may have been immunizing their child/children because they know it is highly recommended. Other parents are reluctant to vaccinate their child/children because they may not be aware of the benefits of immunization and may have difficulty accessing service. Parents are reluctant to immunize their children due to the myths or fable communicated in society.

Purpose of the Study

The purpose of this study is to investigate the possible influencing factors for parents to immunize their children. To educate parents about the importance of immunizing their child/children to increase resistance to infections and diseases.
Also, to highlight how inadequate vaccination increases susceptibility to diseases or infections, which can affect a child’s cognitive development.

Research Objectives

1. To ascertain the perception of parents regarding immunizing their children.
2. To ascertain factors that contribute to non-immunization of children.

Research Questions

1. To what extent is there a benefit to immunization?
2. Does an immunize child have greater resistance to communicable disease as opposed to a non-immunized child?
3. What factors assist parents/guardian’s decisions to have their child immunized, despite societal myths?

Significance of the Study

Children are our future generation, and they must be protected against infections and diseases at all-times; thus, this literature review will highlight the basic importance of immunizing young child/children. The immune system of a child is weak, which makes him or her more susceptible to infections and diseases. Therefore, it is an artificial vaccine that becomes the shield against infections and diseases for them. Immunization aids in controlling the outbreak and further transmission of diseases within a population. The educational aspect of the child may be affected if the child is not adequately immunized; thus, it is very effective to eliminate communicable diseases by setting trend health-wise to promote immunization as it is very beneficial to the child and other members in the society. The literature will also highlight if an immunized child has greater resistance to communicable diseases as opposed to a non-immunized child and if parents/guardians know the importance of immunization and what help parents/guardians’ decision in having their child immunized.

Method

Research Design

A cross-sectional survey research design was used. Cross-sectional studies are carried out at a one-time point over a short period. This design is usually used to estimate
the prevalence of the outcome of interest for a given population, commonly for
the purposes of public health planning (Levin, Study design III: Cross-sectional
studies, 2016). The design was chosen to prevent bias, while simultaneously
acquiring valid data that were used to determine the deciding factors influencing
parents who choose to immunize their child.

**Population and Sample**

The study was conducted at the Harbour View Health Center, a type 3 Health
Center in the Kingston and St. Andrew (KSA) Health department of the Ministry
of Health (MOH)/ South East Regional Health Authority (SERHA).

The target population chosen for this study consists of both men and women
considered parents or guardians who seek child health services (immunization) at
the Harbour View Health Center. Information received from the records at the
Harbour View Health Center indicates the average population for parents seeking
child health service (immunization & follow-up) is approximately 1,849 annually.
Therefore, an average of 155 patients (parents/guardians) seeks immunization
services monthly for their children.

The inclusion criteria are parents, or guardians must be 18 years or older seeking
child health service (immunization & follow up) at the Harbour View Health
Center. They must be willing to take part in the study. The exclusion criteria are
parents, or guardians that are absent; those below age 18 and who refuse to partake
in the study.

The information received from the records at the Harbour View Health Center
indicated the average population for parents seeking child health service
(immunization & follow-up) was approximately 1,849; and an average of 155
patients (parents/guardians) sought immunization services monthly for their
children. Using an online sample size calculator from a total population of 155
parents or guardians, a confidence interval of 95% and a margin of error of five
percent was utilized and a sample size of 111 persons were generated from the
software formula (Creative Research Systems, 2012). However, due to financial
constraint and limited time a sample size of 50 participants (parents/guardians)
both male and female ages 18 years and older were conveniently selected at the
Harbour View Health Center.
Data Collection

Data were collected using a structured questionnaire, which consisted of 19 questions. The questions sought to address each research question as well as to collect demographic information from the participants. For instance, questions one to four were designed to collect demographic information, while questions five to 18 addressed the research questions. The parents or guardians were asked to select answer all questions by ticking one choice applicable to each question. He/she would choose the option that applied to him/her and was asked to tick that answer letter. The questionnaire should took approximately 10-15 minutes for completion.

Procedures

After obtaining ethical approval from the Research and Ethics Committee, College of Health Science, at the University of Technology, Jamaica, the researchers sought and received permission to conduct the study from the South East Regional Health Authority (SERHA). In this study, the information was collected using self-administered questionnaires developed by the researchers. For two days, Tuesday and Thursday at about 9:00 a.m., the researchers visited the Harbour View Health Center while the child health clinic was in session.

The participants were allowed five to 10 minutes to decide if they would participate in the study. Those who volunteered were given a consent form before they were allowed to complete the questionnaire. Verbal and written instructions for completion of the questionnaire were given by the researchers. The participants were assured that their participation would be held confidential and that anonymity would be maintained. Completed questionnaires were collected daily on the days mentioned earlier.

Data Analysis

Data were analyzed based on the different categories from which they were collected. Different measures of central tendencies such as the mode and mean were conducted to point out larger or smaller variability and to allow for comparisons. Basic univariate was used to determine the percentage and frequency of the answers selected in the questions that are expounding on only one variable at any given time. The results were summarized in frequency tables, and graphical figures, and data were analyzed using SPSS version 22 software.
Ethical Considerations

The ethical considerations, as it relates to research, are rooted in the morals of the researcher. It basically outlines what is morally acceptable from what is unacceptable (Resnik, 2015). The ethical principles considered in this research included confidentiality of the information gathered from the participants, obtaining consent prior to data collection, ensuring the participants and their information are kept safe as the questionnaire did not require any identifying markers such as name. In addition, data were secured by the research supervisor in a locked cabinet at Caribbean School of Nursing (CSON) at Cancara and made accessible only to research group members as requested. After the completion of the study, the questionnaires were shredded.

Four ethical principles were used to guide the study. These included the principles of respect for persons, beneficence and justice, right to voluntary participation and the right to informed consent will be demonstrated (Belmont Report as cited in OHRP, 2011). In maintaining these principles, a meeting of the group, signing of consent forms and data collection was done at a mutually agreed time. The study population was informed of the minimal risk associated with participating in the study, informed consent was signed. There was no penalty of any kind for those who refused to participate and those who decided to withdraw at any time from the study. Anonymity and confidentiality were preserved by assigning a number to each participant rather than names and participants were selected only because they met the inclusion criteria of being a parent or guardian over 18 years seeking child health service at the Harbour View Health Center.

Limitations of the Study

While conducting the survey at the Harbour View Health Center, some of the limitations faced by the researchers included:

1. A short time span to complete and submit the study. Deadlines were close so data collection and analysis although it had to be thorough also had to be very accurate and checked in a short time;
2. Financial difficulties; there were expenses incurred to print the questionnaires, transportation to and from the location and food for the days that the researchers collected data;
3. Some parents chose not to participate in the survey and the total number of parents that were expected for a given day did not attend the Health Center.
This deducted from the expected number of questionnaires to be completed on a given day.

4. Parents whose children met the requirements for the study were present at the Health Center on the given dates but because they were not seeking child health services on the given day they could not be included in the study.

5. Some parents did not want to respond to the open-ended questions because they thought it was time-consuming. Hence, they had to be prompted to complete the questions and the researchers had to scribe for some of the respondents because of intellectual challenges; and had to refrain from being bias and giving away answers.

Results

Data collected from the survey conducted at the Harbour View Health Center was represented, analyzed and briefly discussed in this chapter. The data collection tool was a researcher-developed questionnaire containing demographic and research questions. A majority of the respondents were parents 92% and minority four (8%) were guardians.

Figure 1. Population Pyramid illustrating Respondents’ Age Group and Gender

A majority of the respondents were females 42 (84%) and eight (16%) males. Of the parents/guardians who responded to the questionnaires majority was > 30 year age group. In the age groups 21–25 years and 26–30 years. The age group with the least was 18-20 years.
Nineteen (38%) of the female respondents stated that they are single, 15 (30%) claimed common law union and eight (16%) were married. No male or female was represented in the divorced category. For educational level skills certification represented the majority 18 (36%) of the respondents as the highest level of education; 14 (28%) secondary level, and nine (18%) tertiary level. Eight (16%) claimed not to have completed high school and one (2%) did not complete the primary level.

Table 1: Parents/Guardian Marital Status and Level of Education

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Number of Respondent</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common law</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>Divorced</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Single</td>
<td>23</td>
<td>46</td>
</tr>
<tr>
<td>Married</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Number of Respondent</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Secondary</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td>Tertiary</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Skills Certificate</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>Didn’t complete Primary</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Figure 2. Population Pyramid showing Gender and the Importance of Immunizing Children
A majority of 32 (64%) female respondents selected all of the above, while five (10%) male respondents chose all of the above. Five (10%) of the female respondents selected boost child’s immune system, another five (10%) chose eradication of diseases. One (2%) of the male respondents selected boost child’s immune system and eradication of diseases respectively. One male (2%) chose preventing disabilities in children, while no female respondents selected preventing disabilities in children. All 50 (100%) of the respondents stated that immunization is necessary.

Twenty-seven (54%) of the respondents stated that immunization should be mandatory because it prevents diseases, illnesses and disabilities; nine (18%) claimed it prevents diseases, illnesses and disabilities and boost immune system and five (10%) chose important for child/children’s health; three (6%) important for child/children’s health and prevent diseases, illnesses and disabilities; two (4%) prevents diseases, illnesses and disabilities and tradition; and another two (4%) claimed to boost immune system. One (2%) selected immunized because its mandatory for school and another one (2%) stated prevents diseases, illnesses and disabilities boost the child/children immune system.
Twenty-seven (54%) of the children belonged to zero to one-year-old group, 20 (40%) belonged to two to five years old, and three (6%) children were six years old. A majority (92%) of the respondents claimed that their child is up to date with vaccination and a minority of four (8%) stated that their child is not up to date with vaccination.

Table 2: Respondents’ Reasons for Vaccinating their Child/Children

<table>
<thead>
<tr>
<th>What was your Reason for Vaccinating your child/children?</th>
<th>Number of Respondents</th>
<th>(%)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare providers encouraged you to do so</td>
<td>3</td>
<td>6.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Mandatory for school</td>
<td>2</td>
<td>4.0</td>
<td>1.50</td>
</tr>
<tr>
<td>Mandatory for school, do not want to be prosecuted by court of law and wants to prevent child/children from diseases</td>
<td>1</td>
<td>2.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Mandatory for school and wants to prevents child/children from diseases</td>
<td>2</td>
<td>4.0</td>
<td>1.50</td>
</tr>
<tr>
<td>Mandatory for school, wants to prevent child/children from diseases and healthcare workers encourage you to do so</td>
<td>1</td>
<td>2.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Wants to prevent child/children from diseases</td>
<td>39</td>
<td>78.0</td>
<td>1.15</td>
</tr>
<tr>
<td>Wants to prevent child/children from diseases and healthcare workers encourage you to do so</td>
<td>1</td>
<td>2.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Wants to prevent child/children from diseases, healthcare workers encourage you to do so and family/friends encourage you to do so</td>
<td>1</td>
<td>2.0</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
<td>1.16</td>
</tr>
</tbody>
</table>
Thirty-nine (78%) selected the reason for vaccinating their child/children because they want to prevent disease, illnesses and disabilities. Three (6%) claimed healthcare providers encouraged them to do so, two (4%) mandatory for school and to prevent diseases, illnesses and disabilities. One (2%) claimed to prevent child/children from diseases, health care workers and family and friends encourage them to do so, wants to prevent diseases, illnesses and disabilities, mandatory for school, do not want to be prosecuted by court of law and wants to prevent child/children from diseases, and healthcare workers encouraged the parent/guardian.

Forty-one (82%) of the female and seven (14%) male respondents stated that immunization should be mandatory. One each of the male and female respondents stated that immunization should not be mandatory. Forty-eight (96%) of the respondents stated that their child was vaccinated at a government institution, and two (4%) claimed that their child/children were vaccinated at both government and private institutions.

A majority of the respondents, 49 (98%) stated that their child/children did not have an allergic reaction to the vaccine; while one (2%) claimed their child had an allergic reaction to the vaccine but did not state the type of allergy.

Thirty-five (70%) of the respondents stated that they heard/learnt about immunization from physician, nurse and healthcare providers. Seven (14%) of the respondents heard/learnt about immunization from family and friend; five (10%) heard/learnt about immunization from both physician, nurse, healthcare providers and family and friends while two (4%) heard/learnt about immunization from physician, nurse, healthcare providers, family and friends and from their

Figure 5. Where the Respondents Heard/Learnt about Immunization
child/children’s school/daycare; and one (2%) of the respondents claimed from their child/children’s school/daycare.

Thirty-two (64%) of the respondents stated that they thought they had sufficient knowledge about immunization while, 18 (36%) claimed they did not have sufficient knowledge about immunization.

Of the total participants, 15 (30%) needed more information on the benefits/risks, 14 (28%) claimed impact on their child/children’s growth and development, nine (18%) safety, three (6%) both benefits/risk and impact on their child/children’s growth and development. Another three (6%) stated benefits/risks, impact on their child/children’s growth and development and cost and insurance coverage; while two (4%) claimed benefits/risks, safety and impact on child/children’s growth and development. One (2%) choose both benefits/risks and safety, another respondent (2%) of the respondents chose safety, cost and insurance and one (2%) stated they would like to learn more about safety and impact on their child/children’s growth and development and another one respondent of the respondents selected benefits/risks, impact on their child/children’s growth and development and cost and insurance coverage.

A majority, 21 (42%) of the respondents claimed safety for their highest concern about vaccine; 15 (30%) of the respondents stated trust of the public health experts and scientific research and 14 (28%) had no concern about the vaccine.
A majority of the respondents 42 (84%) were females where 36 (72%) stated that there were no difficulties to parents immunizing their child/children and six (12%) females responded that they thought parents experienced difficulties to immunization. The eight (16%) male respondents believed there were no difficulties to parents immunizing their child/children.

**Discussion**

In the study conducted at the Harbour View Health Center of a sample size of 50, the majority of the respondents 44 (84%), were females and minority, eight (16%) were males ranging from 18 to greater than 30 years old. The respondents mostly belonged to the greater than 30 age group with a total of 22 (44%), 18 (36%) represented the female respondents, and four (8%) represented the male respondents. The least number of respondents belonged to the 18 to 20 age group represented by only two (4%) of females. The highest marital status was represented by 23 (46%), then common-law union 18 (36%) respondents and in the minority was the single represented by nine (18%). The highest level of education for most of the respondents was the skills certification represented by 18 (36%) respondents followed by the secondary level represented by 14 (28%) while, the least level of education level was the primary level represented by one (2%) of the respondents. A majority 46 (92%) of the participants were parents while four (8%) were guardians with their children ranging from zero to six years old. Twenty-seven (54%) of the children belonged to zero to one-year-old group, 20 (40%) belonged to two to five years old, and three (6%) children were six years old.

Most of the parents (64%), said they had sufficient knowledge about vaccines, while 18 (36%) claimed they do not have sufficient knowledge. However, most of
the children (92%) were up to date with vaccines while only four (8%) were not up to date. This means that 32 (64%) of the respondents claimed they had sufficient knowledge and their children were up to date with vaccination. Fourteen (28%) of the respondents stated that they had insufficient knowledge about immunization and their children were up to date with vaccination, and four (8%) claimed insufficient knowledge about immunization and their children were not up to date with immunization. Fifteen (30%) of the respondents indicated that they would like to know more about the benefits/risks of vaccination, 14 (28%) indicated to know the impact on their children’s growth and development, 18% chose safety, while the remainder of respondents chose a mixture of choices and some also included cost and insurance coverage. According to Al-lela, Bahari, Al-Qazaz, Salih, Jamshed and Elkalmi (2014), a study done in Mosul, Iraq to evaluate the correlation between parental knowledge-practices and children’s immunization completeness the evidence is there to support the claim that parents who had greater knowledge about immunization chose to immunize their children making informed decisions. Although the parents at the Harbour View Health Centre stated they wished they knew more about immunization, their children were up to date with immunization.

Most respondents are dependent on the government institutions to provide child health services vaccination for their child/children in that 48 (96%) were vaccinated at government institutions while only four percent were vaccinated at both private and government institutions and none at only private institutions. Multiple factors enhanced such decision by parents. Some parents stated that they prefer to attend the health center because it is more affordable, accessible and available to them rather than having to go to a private doctor, which would be more expensive.

This study revealed that 46 (92%) of the children were up to date with vaccination; however, four (8%) claimed that their child was not updated with vaccination regardless of that all 50 (100%) of the respondents indicated that immunization was necessary and despite the fact that a majority, 49 (98%) of the respondents stated that their child/children did not have an allergic reaction, only one respondent claimed that his/her child had an allergic reaction. In addition, a majority of the 37 respondents (32 females & 5 males) selected “all of the above” for the importance of immunization. This means that a majority of the respondents were in agreement with all the responses for the importance of immunization. Nevertheless, six (12%) of both male and female respondents, each claimed to boost the child’s immune system and eradication of diseases, respectively. In contract one male respondent stated that it prevents disabilities in children.

Immunization is globally advertised thus making some individuals knowledge-
able through multiple sources. Studies conducted by Al-lela, Bahari, Al-Qazaz, Salih, Jamshed, and Elkalmi, (2014), and Jones, Omer, Bednarczyk, Halsey, Moulton, and Salmon (2012) revealed that parents got information about vaccination by reading from literature, watching television, listening on the radio and from the internet. Whereas in the study conducted at the Harbour View Health Center, 35 (70%) of the respondents stated that they heard/learnt about immunization from physician, nurse and healthcare providers. Seven (14%) of the respondents heard/learnt about immunization from family and friend, five (10%) heard/learnt about immunization from both physician, nurse, healthcare providers and family and friends while two (4%) heard/learnt about immunization from physician, nurse, healthcare providers, family and friends and from their child/children’s school/daycare and one of the respondents claimed from their child/children’s school/daycare.

In a study that was conducted by Hagan and Phetlhu (2016) in the Kumasi region of Ghana with a sample size of 303 parents, it showed that the majority (78.3%), chose to immunize their children due to fear of the children contracting infectious diseases and easy access to immunization. Some took advice from family and friends and others just wanted to know the child’s health status. Similarly, in the study conducted at the Harbour View Health Center, most of the respondents’ reasons for vaccinating their child was also to prevent diseases, illnesses and disabilities. Furthermore, 54% of respondents thought immunization is necessary because it prevents diseases, illnesses and disabilities. This agrees with the findings of the study by MA, Albarraq, Abdallah, and Elbur (2013).

Forty-one (82%) of the female respondents stated that immunization should be mandatory while seven (14%) of the male respondents also agreed that it should be mandatory. One each (both male & female) respondents reported that immunization should not be mandatory. Those who agreed, felt that it prevents diseases, illnesses and disabilities; it is important for the child/children’s health and well-being; the benefits offered to child; and it is mandatory for school.

At the Harbour View Health Center, safety was the highest concern about vaccines among the respondents, with 21 (42%) of the respondents claiming safety for their highest concern about vaccine, 15 (30%) of the respondents stated trust of the public health experts and scientific research and fourteen (28%) had no concern about vaccine. In a study Parental Hesitation in Immunizing Children in Utah by Luthy, Beckstrand, and Callister (2010) many item responses indicated parental concern mainly about the vaccine side-effects and its safety (Luthy, Beckstrand, & Callister, 2010).

Forty-four (88%) of the respondents stated that there were no difficulties with
parents immunizing their children. However, six (12%) females reported that they thought parents experienced difficulties to immunization. One respondent believed immunization prevented illnesses and diseases, one did not believe in immunization, another one claimed some parents are negligent while others do not think it is safe. Another respondent claimed that the time to do the immunization was a problem. Therefore, suggested that it should be done in the schools.

Conclusion

It can be deduced from the study that most of the participants were female, parents over the age of 30, who were single, and with the highest level of education was skill certification. Twenty-seven of the children were one year old and younger, 48 of which were vaccinated at a government institution and 49 who did not experience an allergic reaction to the vaccines administered.

All the respondents admitted that immunization is important. Of the 50 respondents, 37 agreed that immunization is necessary because it boosts the children’s immune system, prevents diseases and eradicates diseases all at once. The information gathered about immunization was received mostly from physicians, nurses and health care providers. More females than males believed that immunization should be mandatory, 37 of the respondents agreed that vaccination prevents diseases in children and more than 50% of the respondents believed they had sufficient knowledge about immunization. For parents who had concerns about immunization, their most serious was the safety of the vaccines, a majority wanted to know more about the benefits and risks, and more than 40% of respondents did not believe that there were any difficulties experienced by the parents when immunizing their child/children. Despite these concerns expressed by a few, many parents had their children immunized.

Recommendations

The information gathered from the study conducted at the Harbour View Health Center revealed that a lot could be done to improve the parents/ guardian knowledge about immunization. Firstly, instead of the repetitive five to 10-minute talks in which they cannot capture all the different aspects of immunization, the healthcare team could have short film or presentation about the importance of vaccination as well as the negative impact if the child is not vaccinated. They could show other countries statistics and images for comparison because some persons
learn graphically and the images will be imprinted in their minds if they decide not to immunize or immunize their child. They can give away books and brochures with the different types of vaccine at what age the child should receive such a vaccine, the importance of vaccinating ones child and the implications of not doing so. This should be done as soon as a woman is pregnant so that when she gives birth, and the child is growing, the parents/guardians would have sufficient knowledge about immunization.

Secondly, most parents have excuses as to why their child missed an immunization appointment such are they had other engagement; therefore, healthcare providers can encourage parents/guardians to send the child with a trustworthy relative or friend on the day of his/her vaccination appointment. Also for the parents who claimed they did not remember their child’s immunization date could use sticky notes on the refrigerator or their smartphones could be used to set a reminder.

Thirdly, social media is a fast way of communicating any information; therefore, a Facebook and Whatsapp group could be created, which could inform all the parents that utilize the Harbour View Health Center where they could have daily reminders about their child’s vaccination date and also serve as a medium whereby they could exchange information about immunization. This can in cooperate parent to parent teaching in that one parent can be the one to talk about what she has learnt about vaccination from the talk and encourage the rest of the parents to immunize their child to help prevent diseases. In addition, mass media like television stations like Community television system limited, Videomax limited and Mediamix limited (CVM), and Television Jamaica (TVJ) and radio stations (RJR, FM, MELLO FM, etc.) could have regular programmes to inform the nation about immunization, have questions and answer sessions and give aways to help motivate parents to immunize and continue to immunize their child/children. Newspapers like Gleaner, Observer, Star, and magazines could have a vaccination sensitization week where information about vaccination will reach the broader public.

Fourthly, more outreach programmes like health fair seminars where health personnel can talk to the parents about immunization should be organized and if their child/children missed any vaccination they can receive it on that day. Also, encourage a domiciliary visit to increase the immunization status, as well as more visits to the school for vaccination.
References


Assessment of Spacer and Asthma Action Plan Usage in Asthma Management at the Bustamante Hospital for Children in Jamaica

AMANDA DALEY
Bustamante Hospital for Children

LISA BROMFIELD
University of Technology, Jamaica

Abstract

The prevalence of asthma in Jamaican children is high; therefore, appropriate guidelines should be practiced to reduce morbidity and mortality and improve their quality of life. The use of spacers with metered-dose inhalers (MDIs) and written asthma action plans are considered important tools for effective management of asthma in children. Spacer and asthma action plan usage at the Bustamante Hospital for Children (BHC) medical clinic was assessed. Participants comprised of 50 caregivers of children with asthma and 6 physicians. A cross-sectional study was conducted, which employed purposive sampling. Questionnaires and interviews were used to collect data over three months. The findings showed that spacers were used at least a few of the times by 46 (92%) caregivers but always by 25 (50%). The majority of the caregivers (49, 98%) did not demonstrate all the required steps of proper inhalation technique. An average number of caregivers (37, 74%) owned an asthma action plan, but it was not utilized by many. Some of the caregivers with an asthma action plan (26, 70%) viewed it as a good tool to have. Correct inhalation technique was carried out by only one caregiver. The most common errors were; not shaking the MDI before the second puff is given (49, 98%) and holding the mask over mouth and nose for less than 10-15 seconds before a second puff is given (primarily double actuations) (18, 36%). The results did not show any relationship between the number of asthma attacks and inhalation technique (p=0.982). All six physicians perceived the use of spacers and asthma action plans as important and beneficial for the management of asthma in children. The study concluded that while most caregivers of children with asthma at BHC medical clinic utilized spacers and an action plan;
compliance was low. Poor inhalation technique was demonstrated by most caregivers. The findings are not generalizable due to the small sample size but reveal the need for routine educational training sessions on spacers and asthma action plans.

Keywords: asthma, asthma action plan, asthma attack, children with asthma, spacer

Introduction

Asthma is defined as a chronic “major non communicable disease that is characterised by recurrent attacks of breathlessness and wheezing, which may vary in severity and frequency from person to person” (World Health Organization [WHO], 2013, Asthma, para.1). During an asthma attack, the bronchial tubes become inflamed, thus causing narrowing of the airways and subsequently the reduction of airflow into and out of the lungs. WHO informs us that although the causes of asthma are not completely understood risk factors such as inhaling asthma “triggers”, e.g., allergens and chemical irritants, aid in its development. Asthma is incurable, and though individuals may appear to be well, the disease is still present and could result in exacerbations at any time (The National Heart, Lung & Blood Institute [NHLBI], 2014, p.1). However, with the knowledge and treatment currently available many people with asthma are able to manage the disease.

The Bustamante Hospital for Children (BHC) was established in 1963 as Jamaica’s specialist paediatric hospital when the paediatric ward at the Kingston Public Hospital (KPH) was transferred to its current location. It is the only children’s hospital in the English Speaking Caribbean catering to patients from birth to 12 years of age. The hospital provides “diagnostic, preventative, curative, rehabilitative and ambulatory services available in medical and surgical specialities and sub-specialities” (South East Regional Health Authority [SERHA], 2010, para. 1.). An asthma clinic was established at BHC in 1997. The clinic operates according to protocols set out in the Caribbean guidelines for the management of asthma and the Global Initiative for Asthma (GINA) guidelines (Rose, Gilbert, Thame, & Bailey, 2009). The Caribbean Health Research Council in Trinidad and Tobago states that “asthma is a serious chronic disease and a major public health problem in the Caribbean” (Bailey et al., 2009, p.3). It was found that “16.7% of Jamaican children aged 2–17 years had self-reported doctor-diagnosed asthma” (Kahwa et al., 2012). The conclusion was drawn that the prevalence of asthma in Jamaican children is high, with the significant risk factors being: chest infections in the first year of life, a history of asthma in the family, and exposure to allergens.
The age of the child, the severity and frequency of asthma attacks and one's capability of efficiently using prescribed medications determine the ideal treatment of asthma (Sawicki & Haver, 2015, para.1). Asthma treatment can control symptoms for the majority of children. A child will, therefore, be able to participate in some activities. Exercise may cause shortness of breath due to airflow obstruction in the lungs, known as exercise-induced bronchoconstriction (EIB). Ninety percent of all people who have asthma will experience EIB during exercise (Asthma and Allergy Foundation of America, 2015, Exercise-Induced Bronchoconstriction [Asthma], para. 1). Avoidance of any asthma triggers to aid in the successful treatment of asthma as well as ensuring that it is brought under control. Further effective actions entail: monitoring asthma symptoms and lung function regularly and understanding how and when to use medications to treat asthma (Sawicki & Haver, 2015).

“When inhalation of aerosolized drugs has become an established means for the treatment of pulmonary diseases in the last fifty years” (Janssens, 2001, p.12). ‘Controller’ and ‘reliever’ medications are the pharmacological options for long-term treatment of asthma. Inhaled corticosteroids are controller medications which are used for regular maintenance treatment. They work by decreasing airway inflammation, controlling symptoms and reducing future risks such as exacerbations and decline in lung function. Reliever medications include inhaled bronchodilators, which are provided to all patients for as-needed relief of breakthrough symptoms, including worsening asthma or exacerbations (Global Initiative for Asthma [GINA], 2015, p.5). ‘Controller’ and ‘reliever’ medications also referred to as therapeutic aerosols, can be administered to the lungs via several means. The aerosol delivery method of focus for this research is the pressurized metered dose inhaler (MDI) with a spacer.

A MDI along with a spacer is the preferred device for drug delivery in asthma management, with the addition of a face mask for children less than four years of age (GINA, 2015). The MDI with a spacer is the most ideal system capable of ensuring that therapy for childhood asthma is both delivered and maintained. In the Archives of Disease in Childhood, it is mentioned that drug delivery to the lungs can be improved by combining a spacer with a MDI (Zar, Weinberg, Binns, Gallie, & Mann, 2000, para. 1). Furthermore, local systemic side effects from drugs, such as inhaled corticosteroid are substantially reduced when a spacer is used (Zar, Weinberg, Binns, Gallie, & Mann, 2000, para. 1). Currently, the metered dose inhalers are available free of cost to the children at BHC. However, access to spacers is a challenge and is made possible only when donated as gifts from private drug companies. MDIs are; therefore, usually dispensed without spacers at BHC unless
such gifts are available. Some caregivers buy a spacer at a community pharmacy, while others use modified Styrofoam cups, plastic bottles or plastic cups as spacers.

Reznik, Silver, and Cao (2014) found that there is a lack of knowledge regarding the execution of proper MDI-spacer technique among some caregivers of children with asthma. This, therefore, indicates the need for educational sessions for these individuals. Poor asthma control and regular visits to the emergency department are common results of the improper use of asthma inhaler device (Al-Jahali, 2013). Improper inhaler technique is also one of the risk factors for poor asthma outcomes. This is so because both the risk of asthma exacerbations and medication side effects are increased.

A written asthma action plan for each patient is encouraged as it serves as a guide for the caregiver to follow. It can aid in daily asthma therapy, an exacerbation of asthma symptoms or even in preparation for increased physical activity. A written asthma action plan is a script prepared by a physician with written instructions for asthma therapy specific to a patient. It assists the caregivers by showing them the correct way in making short-term changes to their treatment in response to changes in the child’s symptoms and/or peak expiratory flow (GINA, 2015). The plan further entails the specifics of how to gain access to medical care. Without an action plan, caregivers may have to seek treatment for an asthma attack in the emergency department. Therefore, interventions to improve the use of this plan should be taken into account to reduce asthma morbidity.

**Rationale**

With the knowledge of the necessity of a spacer for the effective management of asthma when using metered dose inhalers, the researcher needs to determine its utilization among children with asthma at the BHC medical clinic. It is essential that the availability of this device is combined with its efficient use, as improper use may result in the delivery of sub-therapeutic doses resulting in inadequate asthma control and frequent attacks. The prevalence of asthma in Jamaican children is high (Kahwa et al., 2012). Thus, appropriate guidelines should be practiced to reduce morbidity and mortality and improve their quality of life. Inappropriate asthma treatment leads to increased asthma attacks resulting in more frequent visits to the hospital’s emergency room. Individualized written asthma action plans improve asthma health outcomes and reduce health care costs (Lawrence, 1995; Pur Ozyigit, Ozcelik, Ozcan, Ciloglu, & Erkan, 2014).
Purpose of the Study

The purpose of this study is to determine if there is a significant need for a programme to be initiated that ensures that all children of asthma use a spacer with their MDIs. This study is also aimed at determining the competency of caregivers with children with asthma to utilize appropriate techniques when administering MDIs.

Objectives

1. To determine the extent of utilization of spacers with a MDI in children with asthma at BHC medical clinic and make recommendations based on the results.
2. To evaluate the inhalation techniques of MDI administration practiced by caregivers of children with asthma to determine the need for improved counselling by the health care team.
3. To determine the prevalence of the use of a written asthma action plan among caregivers of children with asthma at BHC medical clinic.
4. To assess caregivers’ perception of a written asthma action plan.
5. To obtain the physicians’ perceptions of the use of spacers and asthma action plans and their link to improve patient outcomes.

Research Questions

1. What percentage of children with asthma at BHC medical clinic utilizes a spacer with a MDI?
2. To what extent does the inhalation technique for administering MDIs differ from required standards?
3. How prevalent is the use of a written asthma action plan among children with asthma at BHC medical clinic?
4. How is the written asthma action plan perceived and used by caregivers?
5. What are physicians’ perceptions of the use of spacers and asthma action plans and their link to improve patient outcomes?

Significance of the Study

The information garnered from this study will determine if there is a significant need for a programme to be initiated that ensures that all children of asthma use a spacer with their MDIs. This study will show the competency of caregivers with
children with asthma and the techniques used when administering MDIs. This may highlight the need for frequent training sessions with caregivers on correct MDI usage. This study will also promote the utilization of an individualized asthma action plan to reduce asthma attacks, reduce emergency department visits and improve the quality of life for children with asthma who are a part of the BHC medical clinic.

**Definition of Terms**

*Actuation*. This is defined as the method of pressing the MDI to release one puff of medication (The Ohio State University Wexner Medical Centre, 2015, p.1).

*Asthma attack*. This occurs when asthma symptoms increase and/or intensify. This is also known as an asthma exacerbation (NHLBI, 2014, p.1).

*Controller*. Inhaled corticosteroid used in the maintenance treatment of asthma to reduce airway inflammation (GINA, 2015).

*Metered dose inhaler (MDI)*. This is a device that delivers into the lungs a measured amount of medication as a mist the patient can inhale. It consists of a pressurized canister of medication in a case with a mouthpiece (American Academy of Allergy Asthma & Immunology [AAAAI], 2016).

*Peak Expiratory Flow*. This is a “test that measures how fast a person can exhale. This test checks lung function” (Phillips, 2012, para. 1).

*Reliever*. Inhaled bronchodilator used to resolve acute asthma symptoms quickly by opening the airways (GINA, 2015).

*Spacer*. This is a tube-like device that makes using an inhaler easier and more effective (Asthma UK, 2019). It attaches to the inhaler on one end and to a mouthpiece or mask on the other end (Pearl Ben-Joseph, 2017).

*Written Asthma Action Plan*. This is a set of individualized written instructions, prepared by a physician that details how a person with asthma should manage his or her asthma at home. It illustrates the daily treatment, describes how to control asthma over a long period of time and how to handle severe attacks (Centres for Disease Control & Prevention [CDC], 2012). This is also called an asthma action plan.
Method

Research Design

A cross-sectional mixed methods study was conducted at the BHC, which employed purposive sampling over the period June to August 2016. An extensive literature review of studies on asthma management in children, along with a pilot study was conducted to justify the research and verify the validity of the method and data collection instruments.

Population

The population for this study was caregivers of children with asthma who were receiving care at BHC medical clinic and the physicians who supervised their management.

Inclusion and exclusion criteria. Caregivers of male and female children aged one to 12 years diagnosed with asthma, attending BHC medical clinic and using both a controller and reliever MDI. According to the Australian Asthma Handbook (2019), asthma should not be diagnosed in infants less than 12 months old. Physicians who oversaw the management of patients with asthma in BHC medical clinic were also included.

Caregivers of children using MDIs for respiratory conditions apart from asthma, those with asthma who do not use a MDI and caregivers of children with asthma who attend BHC asthma clinic.

Sample

The Medical Records Department (MRD) at BHC is responsible for entering patient’s diagnoses in the Patient Administration System (PAS). According to this software, the number of patients with asthma admitted to the hospital in 2014 was 156. It was reported by the MRD that the number for 2015 could not be retrieved from the system at the time of request due to incomplete data entry in PAS. Therefore, a population size of 156 patients was used to calculate the sample size using the Raosoft’s Web-based Inter-Form survey software. Using this tool, the researcher accepted a five percent margin of error with a 95% confidence interval and a 50% response distribution. With these parameters a sample size of 112 patients was recommended. However, a sample size of 50 caregivers of children with asthma
and six physicians were obtained in this study. The small sample size of caregivers was due to the time of year when the research was conducted when there are usually fewer asthma exacerbations. BHC medical clinic is managed by three medical teams, and each team usually consists of four physicians. To obtain a representative sample, the participation of two physicians from each team was sought.

**Data Collection**

Face-to-face interviews and questionnaires were administered to caregivers of children with asthma in the pilot study and questions were revised as needed by the research team. Informed consent was obtained from the caregivers of children with asthma on the day of their clinic visit. Once consent was granted, the researcher obtained information from the caregivers using the questionnaires and interviews with open-ended questions confidentially in an unoccupied room of the Outpatient Department, where the medical clinic is located. Queries were clarified by the researcher. With approved consent interviews using open-ended questions were also conducted with physicians who oversaw the management of patients with asthma visiting BHC medical clinic. For participant confidentiality names and registration numbers were not recorded during data collection.

**Data Analysis**

Data from questionnaires were analyzed using the SPSS version 21 software. P-values of < 0.05 was used to indicate statistical significance using a 95% confidence interval. For this study, mainly frequencies and percentages were captured and analyzed. Cross-tabulations and case summary statistics were also utilized. Linear regression was also used to determine the level of significance for the variables under review.

The descriptive analysis of responses to caregiver and physician interviews was done using SPSS version 21. Information was firstly coded to reflect similar responses that would facilitate easier analyses. This statistical package captured the frequency of responses and percentages of responses to each question. The data was also analyzed using case summaries and cross-tabulation. Inhalation techniques of MDI usage with a spacer was compared with recommended guidelines. The respondents’ perceptions of the use of an asthma action plan were analyzed by using descriptive and inferential statistics.
Ethical Considerations

Ethical approval was granted from the University of Technology, Jamaica Ethics Committee and the South Eastern Regional Health Authority (SERHA) Ethics Committee. Following ethical approval, the research commenced, and informed consent was obtained from physicians and caregivers before the administration of questionnaires and interviews. To protect the privacy of the participants, face-to-face interviews and questionnaires were conducted in a confidential area. In addition, names and registration numbers were not recorded, and only the participant’s signature was required on the consent form. The data collected was carefully stored in an opaque folder, kept and accessed by the researcher and statistician only. Participants were informed that the completed study would be submitted to SERHA and the University of Technology, Jamaica. The participants may request a copy of the study from SERHA if they desire feedback of the results. They were also informed that readers would not be able to identify them as their names were not included in the research paper.

Results

The response rate for the study was 100%. In the interview, the caregivers demonstrated their inhalation technique using a commercial spacer with a mask and an empty MDI provided by the interviewer. The interviewer observed whether the caregivers adhered to the required standard of a 10 step checklist (Table 1).

Table 1: 10 Step Checklist for Inhalation Technique

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Take the plastic cap off the MDI</td>
</tr>
<tr>
<td>2.</td>
<td>Put the MDI upright into the rubber hole of the spacer</td>
</tr>
<tr>
<td>3.</td>
<td>Have the child sit or stand in a comfortable position</td>
</tr>
<tr>
<td>4.</td>
<td>Hold the MDI and spacer together. Shake it 5 times.</td>
</tr>
<tr>
<td>5.</td>
<td>Put the mask firmly onto the child’s face covering the mouth and nose</td>
</tr>
<tr>
<td>6.</td>
<td>Press the MDI down firmly once</td>
</tr>
<tr>
<td>7.</td>
<td>Hold the mask over the child’s nose and mouth for 10 to 15 seconds</td>
</tr>
<tr>
<td>8.</td>
<td>If the child needs to take more than 1 puff of the medicine, repeat steps 4 to 7</td>
</tr>
<tr>
<td>9.</td>
<td>Take the mask off the child’s face</td>
</tr>
<tr>
<td>10.</td>
<td>Rinse the child’s mouth with water after using a controller MDI</td>
</tr>
</tbody>
</table>

Adapted from Sharon et al. (2009)
Only one caregiver correctly completed all 10 steps of administering an MDI with a spacer device (Figure 1). Twenty-two (44%) of the caregivers committed one error; resulting in a difference from required standards by 10%. The difference from required standards was as high as 40%, that is, four errors in the ten steps were committed, which was seen in one caregiver. Similarly, Reznik, Silver, and Cao (2014) found that only one of 169 caregivers completed all the required steps of administering a MDI with a spacer (p. 2). This does not indicate that the caregivers at BHC medical clinic have not received training by a health care professional. Arora et al. (2014) realized that even patients who were trained by a doctor made 56.3% error, while ones who were self-educated committed 100% error. Kamps, Brand, and Roorda (2002) found that correct demonstration of inhalation technique was noted more in patients who received repeated instruction sessions and also in those who had previously been asked to demonstrate the technique compared to others who had no prior knowledge ($p < 0.001$ & $p = 0.03$, respectively). Therefore, frequent training may improve inhaler technique.

Using the inhalation technique checklist for this study, the most common errors made were not shaking the MDI before the second puff was given ($n=49$, 98%), holding the mask over the child’s mouth and nose for less than 10–15 seconds before the second puff was given (primarily double actuations) (36%) and not shaking the MDI before first puff was given (20%) (Figure 2). Not shaking the MDI before giving the first puff of medication reduced the total output of the drug by 25.5% ($p < 0.01$) and reduced the amount of particles that are less than 6-8 µm in diameter by 35.7% ($p < 0.01$) compared with the standard protocol of shaking it (Everard, 2001).
Particles less than 6–8 µm in diameter are very small and are more likely to be deposited in the lungs than larger particles when inhaled. The study also stated that double actuations did not reduce the total output but did produce a 15.8% decrease in the amount of particles less than 6-8 µm in diameter (\( p < 0.01 \)). Therefore, not shaking the MDI before the second puff is given may reduce the dose of the drug given as there are less small particles than when shaken, thus reducing the dose reaching the target site.

Linear regression did not show any relationship between the number of asthma attacks in children and the caregiver’s inhalation technique (\( p = 0.982 \)). However, studies showed that improper use of MDI is associated with increased risk of hospitalization (\( p = 0.001 \)), poor disease control (\( p < 0.0001 \)) (Melani et al., 2011), and uncontrolled asthma (\( p = 0.001 \)) (Al-Jahdali et al., 2013). Also, providing standardized education about MDI-Spacer device use to children and parents leads to correct MDI-Spacer device use (\( p < 0.001 \)) and is associated with improvement in asthma symptom score (\( p < 0.001 \)) and asthma control (\( p < 0.001 \)) (Turkeli, Yilmaz, & Yuksel, 2016, p.105). Reasons why linear regression showed no
The relationship in this study could be as a result of the small sample size and other variables such as the exposure to environmental triggers. Exposure to allergens, environmental tobacco smoke and poor air quality has an important effect on exacerbations in young children with asthma (Dick, Doust, Cowie, Ayres, & Turner, 2013).

The responses to whether a spacer was normally used to administer MDIs varied from always to never (Table 2). Spacers were utilized at least a few times (defined as less than 50% of the time) by 92% of the caregivers, but only 50% always administered the MDI with a spacer. This shows that a high percentage of caregivers visiting BHC medical clinic utilized a spacer when administering MDIs to children with asthma. However, its inconsistent use is a cause for concern. The prevalence of spacer utilization among school-entry children (4-6 years old) with asthma in Australia was 83% over the period 2000–2005 (Phillips et al., 2007). Even though the inhaler technique is generally very poor among children, it is better when they use their MDIs with spacers (Gillette et al., 2016, p. 605). Spacers allow greater lung deposition of the MDI than a correctly used MDI without a spacer \( p < 0.01 \) and they also reduce oropharyngeal deposition \( p < 0.01 \) (Newman et al., 1984, p.935). Oropharyngeal deposition of inhaled corticosteroid increases the risk of oral candidiasis; hence caregivers should ensure that their child rinses his or her mouth after receiving an inhaled corticosteroid. Spacers were also shown to improve asthma control (Sritara & Janvitayanuchit, 1993, p.693).

Of the 46 caregivers who reported using spacers at least a few times, 60.9% used commercial spacers, 21.8% used Styrofoam (polystyrene) cups, 6.5% used plastic cups, 4.3% plastic bottles and 6.5% used a Styrofoam cup interchangeably with a

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>25</td>
<td>50.0</td>
</tr>
<tr>
<td>Most of the time</td>
<td>12</td>
<td>24.0</td>
</tr>
<tr>
<td>Few times</td>
<td>9</td>
<td>18.0</td>
</tr>
<tr>
<td>Never</td>
<td>4</td>
<td>8.0</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Note.* Most of the time = greater than 50% of the time.

Few times = less than 50% of the time.
plastic cup or a plastic bottle (Table 3). Even though spacers are important aids for use with MDIs, “expense and unavailability of commercially produced spacers in developing countries have limited their use” (Zar, Liebenberg, Weinberg, Binns, & Mann, 1998, p.75). They investigated the relative efficacy of three spacers, namely, a commercially available spacer, a modified 500-ml cold drink bottle and a polystyrene cup. They were used for delivery of aerosolized drugs to children with asthma older than five years. Median aerosol lung deposition was significantly greater for the conventional spacer than for the polystyrene cup (31.5% vs. 9.5%; \( p = 0.005 \)). However, median aerosol deposition for the conventional spacer and sealed bottle were equivalent (40.5% vs 44%) (p. 75). Therefore, a modified 500-ml cold drink bottle is an efficient spacer. On the contrary, the modified polystyrene cup is not an efficient spacer, delivering between a third and a fifth of the dose that other spacers were capable of delivering (p.75). Studies comparing the use of spacers with MDIs and asthma attacks were not found.

Five physicians recommended that the caregivers buy a spacer instead of making one. If a caregiver expressed concerns about the availability of funds to purchase a spacer, Styrofoam cups, plastic cups and/or plastic bottles were recommended. Styrofoam cups were more popularly recommended, which is in contradiction with the study by Zar et al. (1998) discussed previously. Most of the physicians (\( n = 4 \)) observed a better level of asthma control in children who used a spacer from those who do not. This is in agreement with other studies (Sritara & Janvitayanuchit, 1993, p.693). Interestingly, a better level of asthma control with the use of commercial spacers instead of homemade spacers was observed by two of the physicians. However, they did not state which type(s) of homemade spacers were less efficient.

<table>
<thead>
<tr>
<th>Types of Spacers</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Spacer</td>
<td>28</td>
<td>60.9</td>
</tr>
<tr>
<td>Styrofoam cup</td>
<td>10</td>
<td>21.8</td>
</tr>
<tr>
<td>Plastic cup</td>
<td>3</td>
<td>6.5</td>
</tr>
<tr>
<td>Plastic bottle</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>Styrofoam cup or plastic cup</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>Styrofoam cup or plastic bottle</td>
<td>1</td>
<td>2.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>46</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
A written asthma action plan was owned by 37 (74%) caregivers, while 10 did not have a plan and three were not sure if they had one. However, only 31 caregivers reported following the asthma action plan at least a few times (Table 4). Of this number, 18 followed it every day or most days (defined as greater than 50% of the time). Children with asthma are referred to BHC medical clinic after being admitted to the hospital ward or emergency department. Sulaiman et al. (2004) stated that children were more likely to own a written action plan if they had either visited a general practitioner in the past 3 months or had been to the emergency department or hospital ($p < 0.001$). Similarly, a majority of the caregivers in BHC medical clinic had an asthma action plan. Simon and Akinbami (2016) research examined national trends in the receipt of asthma action plan among children with asthma aged two to 17 years, in the USA from 2002 to 2013. They found that the percentage of those who received an asthma action plan increased from 41.4% in 2002 to 50.7% in 2013, with a resulting $p$-value of less than 0.001 for this trend (p. 283).

Of the 31 caregivers who follow the asthma action plan at least a few of the times, 26 of them were of the view that the plan improved their child’s health. They reported that following the plan has led to decreased wheezing ($n = 9$); decreased hospital visits ($n = 8$); decreased asthma attacks ($n = 6$) and others ($n = 3$). Likewise, the action plan was found useful by caregivers, with 82% reporting its use to manage an acute attack (Sulaiman et al., 2004). The study also found that caregivers with a written asthma action plan were better at recognizing the difference between preventer and reliever medications as well as recognizing an asthma attack ($p = 0.01$ & $p = 0.006$, respectively) (p. 211). Dinakar, Osdol & Wible (2004) stated that nine of every 10 caregivers with a personal written asthma action plan reported it to be of value in managing asthma attacks (p. 807). In a study on adults with

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>3</td>
<td>8.1</td>
</tr>
<tr>
<td>Most of the time</td>
<td>15</td>
<td>40.6</td>
</tr>
<tr>
<td>Few times</td>
<td>13</td>
<td>35.1</td>
</tr>
<tr>
<td>Never</td>
<td>5</td>
<td>13.5</td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
<td>2.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>37</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Note. Most of the time = greater than 50% of the time; Few times = less than 50% of the time.*
asthma, the average level of confidence and perceived efficacy toward their action plans were high (Beauchesne, Levert, Tawil, Labrecque, & Blais, 2006, p. 306). Similarly, Douglass et al. (2002) found that most patients with knowledge of action plans viewed them favourably and most of the patients with an action plan prescribed by a doctor used it in the management of their asthma (p. 3).

Linear regression did not show any relationship between the number of an asthma attack in children of caregivers who utilize an asthma action plan from those who did not ($p = 0.963$). The difference was not statistically significant, which may be as a result of our small sample size. Also, we assumed the correct usage of the asthma action plan by caregivers but did not assess same. Similarly, a study done in Trinidad did not show statistically significant improvement in outcomes in those with a personalized written asthma action plan in relation to fewer visits to the emergency room ($p = 0.78$) and reduced asthma attacks ($p = 0.84$) (Khan, Maharaj, Seerattan, & Babwah, 2014, p.17). This could be as a result of their small sample size of 91 children. However, despite their findings, they concluded that in order to prevent exacerbations in children with asthma, it is still crucial to have an asthma action plan. This recommendation is in accordance with the Global Initiative for Asthma international guidelines (GINA, 2015), which was followed by all the physicians who participated in this study (p. 28).

All physicians reported seeing an increased level of asthma control when an asthma action plan was used. These benefits of an asthma action plan have been tested and proven. Foliaki et al. (2009) did a ‘before and after’ assessment trial of an asthma action plan, with each participant serving as his or her own control. They found that emergency doctor visits decreased from 66% in the previous 12 months to 18% ($p < 0.001$) in the following 12 months. There were improvements with other measures that were put in place, including hospital admissions (from 19% to 3%, $p = 0.001$) and severe asthma attacks (from 54% to 18%, $p < 0.001$). On the other hand, not possessing a written asthma action plan was one of the factors associated with hospital admissions (OR 4.0; 95% CI 1.5-10.7; $p = 0.005$), repeat admissions (OR 5.9; 95% CI 1.2-28.1; $p = 0.02$) and repeat emergency department visits (OR 2.2; 95% CI 1.1-5.6; $p =0.04$) (Adams, Smith, & Ruffin, 2000, p. 569). That is, without an asthma action plan, patients are four times more likely to have hospital admissions, 5.9 times more likely to have repeat admissions and 2.2 times more likely to have repeat emergency department visits.
Conclusion

Access to spacers among caregivers of children with asthma at BHC medical clinic was very high; however, compliance with its use was low. Poor inhalation technique was demonstrated by most caregivers of children with asthma at BHC medical clinic. The most common errors made were not shaking the MDI before the second puff was given, holding the mask over the child’s mouth and nose for less than 10-15 seconds before the second puff was given (primarily double actuations), and not shaking the MDI before first puff was given. There was no statistical difference between the number of asthma attacks in children and the caregiver’s inhalation technique. The number of caregivers who owned an asthma action plan was average, and compliance with its use was low. Asthma action plans were viewed positively by most caregivers who owned a plan. Physicians perceived the use of spacers and asthma action plans as important and beneficial based on their observations and international guidelines.

Recommendations

While further studies with larger sample sizes are recommended to allow for generalizability, the researcher recommends the institution offer frequent educational training sessions at BHC with caregivers of children with asthma, physicians, pharmacists, nurses and other health care professionals. Caregivers’ inhalation technique should be assessed at each clinic visit and caregivers’ referred to training sessions as needed. Training sessions should be conducted regularly on scheduled days. These educational training sessions would be aimed at improving inhalation technique and compliance with spacers and asthma action plans, as recommended by GINA international guidelines, to increase asthma control and reduce asthma attacks in children. The National Health Fund Pharmaceuticals supplies BHC with MDIs. In addition to these MDIs, the hospital could request that they supply commercial spacers to facilitate their efficient use with documentation to track its distribution. However, if there are financial constraints, physicians should recommend only plastic bottles as alternatives.
References


Dinakar, C., Van Osdol, T. J., & Wible, K. (2004). How frequent are asthma exacerbations In a pediatric primary care setting and do written asthma action plans help in their management? Journal of Asthma, 41(8), 807–812


Foliaki, S., Fakakovkaetau, T., D’Souza, W., Latu S., Tutone V., Cheng, S., & Pearce N. (2009). Reduction in asthma morbidity following a community-based asthma self-


*Vol. 13, No. 1, March 2020* 119
Case Study:
Developing and Delivering an Energy Awareness and Conservation Training Programme to Teachers and Students at a Secondary School in Jamaica

KIRKLAND ROWE, THERESE CHAMBERS, ELECIA JOHNSON
University of Technology, Jamaica

NOEL BROWN
Caribbean Maritime University

Abstract

Schools, like most organizations globally, are earnestly seeking opportunities to reduce the cost of energy supplies by engaging in conservation strategies and the adoption of new technologies such as solar PV systems. However, one practice to avoid is the adoption of the latter without significant consideration for conservation strategies. This paper presents the case of developing and executing an energy management and conservation training and awareness programme component of a project to implement a solar PV system at a secondary school in Jamaica. For the pilot secondary school of approximately 1,800 students served by 120 staff members, three distinct training exercises were developed to improve the energy conservation awareness of participants by highlighting relevant energy concepts and conservation strategies. Select groups of teachers and students received specialized training in energy management principles and conservation, while the entire school population was trained on energy conservation strategies. To evaluate the effectiveness of this programme, a survey instrument in the form of a multiple-choice test was developed and administered to approximately 5.6% of the student population. It has been determined that the school population has a high level of awareness since 96% of students achieved a grade of 70% or higher. The average score achieved by the student body on the instrument was 87%. This result was further supported by a 16% reduction in the school’s energy consumption in the following year when compared to previous years.

Keywords: energy awareness, energy management, conservation training, electric energy consumption
Introduction

Public schools in Jamaica receive a substantial portion of their annual budget from the Government of Jamaica (GOJ) via subventions from the Consolidated Fund. The total subvention allocation for a school was approximately JMD $11,500 per student/year as at the FY 2015/16; which was subsequently increased to JMD $19,000 per student/year for FY 2016/17 (Carter, 2016). Whilst not mandatory, secondary schools seek to augment the subventions received via the payment of auxiliary fees by parents.

A significant recurrent operating cost identified for these institutions is the electric energy cost, which can account for up to 40% of their annual expenditure (PertoCaribe Development Fund, 2016). To address this, the GOJ has undertaken several initiatives at the national level to introduce energy-saving strategies in schools using various methodologies, inter alia, introduction of energy-efficient equipment, e.g., lightbulbs, energy conservation awareness programmes and renewable energy (RE) installations to include solar thermal and solar photovoltaic systems; which have realised varying results.

One reason for the low return on investment from these initiatives could be because the school communities were not properly prepared to use these technologies. Before the implementation of any renewable energy system, it is advisable that an energy management programme is established to manage energy use and conservation opportunities (Capehart, Turner, & Kennedy, 2012). It is after these opportunities have been exploited that the true energy consumption of the institution is known. Following which, a suitable, optimised renewable energy system, can be implemented. This approach will result in the requirement for a smaller capacity RE system and considerable savings on capital expenditure (Turner, & Doty, 2006).

This case study examines one component of an approach taken by a funding agency with a plan to implement a solar PV system at a secondary school in Jamaica. The agency has taken steps to engage in activities to first exploit the opportunities to initially reduce energy consumption at the school. The overall project is being done with a view to assessing the efficacy of consolidating and deepening energy-targeted investment gains at the institutional level by piloting a designed energy-targeted programme of works in the secondary school. The funding agency identified one secondary school to be used as the pilot to assess the feasibility of standardised implementation of a programme of works that combine energy efficiency, conservation and renewable energy solutions in one project to maximize energy related investment gains.
This is not a case study of the overall project. However, this case study focuses on the development and execution of the training programme and the level of awareness among the student population after the delivery of the training. The training was expected to provide the support necessary for energy initiatives to reduce electric energy consumption and promote investments in renewable energy.

The funding agency envisioned that training should concentrate on the development, and implementation of an energy management policy and a training and awareness module for students and staff of the school to increase energy consciousness and conservation practises and to collect data to demonstrate their awareness.

The project which was scheduled to run for three months, from mid-November 2016 to mid-February 2017, was awarded to a team of consultants from the University of Technology, Jamaica after a competitive bidding process (University of Technology, Jamaica, 2017).

Site Description

The school is a co-educational secondary institution established in 1958 by the Anglican Church in Jamaica. The school has a complement of approximately 1,800 students served by 120 staff members, housed in 16 distinct buildings on a property of about 20 acres. The school’s primary objective is to provide secondary education to the students from Grades seven to 13. As a government-aided church school, the student body comprises a student cohort drawn primarily from Central Jamaica following their successful completion of the Grade Six Achievement Test (GSAT) Examinations.

The architectural styles of the buildings are typical of educational institutions in Jamaica. All buildings that have human occupants are concrete block-and-steel structures. Roofing varies between metal sheeting and concrete-slab. Windows and other openings in walls facilitating lighting and ventilation are also varied with a mix of aluminium louvers, concrete louvers, decorative blocks and glass pane windows.

Energy Consumption

To be able to provide information on energy use and conservation opportunities, an energy audit was conducted, which reviewed energy use data for a 12-month period, by a separate project team before the training team was engaged. The total electrical power consumption for the school was reported to be 92,057 kWh with
a typical weekday maximum demand just below 40 kW and an average power factor of 0.98. A typical weekday demand profile for the school is shown in Figure 1 above.

The main electric energy consumers identified in the report were air conditioning equipment (HVAC), lighting, fans, computers, pumps and workshop equipment. Their contribution to the overall energy use was not outlined in the report. To the merit of the school, the audit revealed that all indoor lighting was upgraded to LED technology, using mostly LED tubes. Additionally, the outdoor lighting consists of fixtures making use of photocells retrofitted with LED lamps. Air conditioning units were installed in computer rooms, offices and staff rooms and a specialised resourced centre. Air conditioning units were mainly non-inverter type and range in age from four months to 11 years (Mona-Tech Engineering Services, 2015).

**Method**

This case study focuses on the development and execution of the training programme and the resulting level of awareness about energy conservation among the student population. The funding agency envisioned that training should concentrate on the development, and implementation of an Energy Management Policy and a Training and Awareness module for students and staff of the school to increase energy consciousness and conservation practises, and to collect data to demonstrate their awareness. As a result, the project team regarded the project as having three distinctive phases of, development and delivery of training curriculum,
energy management policy development, and determining the awareness of the student population.

Training

The training component of the project was divided into three modules listed in Table 1. Each module was designed to achieve the expected outcomes of the project and encouraged sustainability to ensure the efforts remain after the initial project ends. Also, each module was designed for a specific population of the school. The modules were approved by an oversight committee appointed by the funding agency before delivery. The school was involved in developing the schedule for the training, selecting individuals to be trained and ensuring the availability of staff and students with minimum disruption to operations.

The modules were delivered through interactive classroom experience involving lectures, discussions, case studies and practical exercises. It was expected that teachers and students who received specialised training would be identified as resources persons to champion the efforts of the project and provide training to colleagues. This was intentional to address the sustainability aspect of the project. The expectation is that the school would always have trained personnel at every level. It is from this group of participants that the Energy Management Committee (EMC) for the school was later selected.

The third module was delivered to all students present at the time of the training and teachers at the school over three days. The knowledge gained from this training was expected to assist the school community in the development, implementation and management of their school’s Energy Management Programme. During the presentations, best practices, hands-on activities (energy audit) and real-life examples were explored to sensitise participants to ways to conserve energy. A flyer which summarised the main points of the presentation was given to every student during the presentation.

A strategy was devised in collaboration with the school on how to train the entire school population. The most optimised and effective approach to deliver this module was to engage students and teachers in their respective classrooms (typically seven classes for each grade level) during regular school hours with multiple trainers simultaneously training students at the same grade level. This format proved to be effective. The vice-principal, an avid supporter of the initiative oversaw the logistics. This type of approach allowed the school greater control of the process and minimum disruption to classes as only one school session was interrupted for each grade. This type of approach might be the most suitable for any school.
the energy conservation and awareness training sessions, energy-saving light bulbs were distributed as an incentive to students who were able to correctly answer questions asked by the trainer during and at the end of the presentation.
Energy Management Policy

The school formed an energy committee headed by an energy manager to develop an energy policy. The composition of the committee was decided by the school in consultation with the project team. The school selected members of the energy committee from the staff and students who participated in the specialised training sessions. From this cohort, the committee and energy coordinators were selected, and their roles formalised by the school. The vice-principal, who was more than qualified, was selected by the school’s management and the committee, in consultation with the project team, as the energy manager. This demonstrated the level of commitment by the management of the school to the project and the success of the programme. The energy committee working with the project team developed the school’s first energy policy, which was fully supported by the school’s management and the project funding agency.

Measuring the Awareness about Energy Conservation

Module three was developed to expose the school population to basic energy conservation and efficiency strategies in keeping with the project objectives. A survey instrument was developed to ascertain that there is an appropriate level of energy awareness among the entire school population, subsequent to delivering the training exercises.

The survey was executed 16 days after the final awareness training session was completed for all students. Students were tested on 11 questions consistent with the content covered in the awareness sessions and the level of awareness expected at this level. Ten questions were presented as true/false and multiple choices with one possible correct answer from a menu of four possible responses. The final question on the paper (Question 11) required students to provide a written response. Each multiple-choice question valued one mark to allow for grading.

The questions on the survey were carefully developed to evaluate various components of the awareness exercise and gauge the general level of awareness of the students. Table 2 provides a more detailed review of the questions on the instrument.

Additionally, an energy meter was purchased and installed at the school as a demonstration to allow the energy committee to track and analyse the energy use of the administrative building. This monitor provides real-time and cumulative data of the energy consumed on the administrative building. Members of the
Table 2: Review of Survey Questions

<table>
<thead>
<tr>
<th>No.</th>
<th>Questions</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kilowatt hour (kWh) is a unit of:</td>
<td>Knowledge of the unit of electrical energy is fundamental to evaluating energy savings</td>
</tr>
<tr>
<td>2</td>
<td>Which of the following is not a renewable source of energy?</td>
<td>General knowledge in our current society especially in light of Vision 2030</td>
</tr>
<tr>
<td>3</td>
<td>What is energy efficiency?</td>
<td>A concept that should be appreciated in light of energy management</td>
</tr>
<tr>
<td>4</td>
<td>Which of the following light bulbs outputting the same amount of light consumes the least amount of energy?</td>
<td>Lighting is one of the most popular and easy to replace/retrofit energy-consuming technology in use</td>
</tr>
<tr>
<td>5</td>
<td>What is the power requirement of a computer that uses 120 V and 0.5 amp?</td>
<td>Promote general understanding of energy calculation and decision making</td>
</tr>
<tr>
<td>6</td>
<td>Which of the following is not an energy conservation strategy?</td>
<td>Evaluate understanding of conservation strategies</td>
</tr>
<tr>
<td>7</td>
<td>Which of the following equipment do you expect to consume the most energy?</td>
<td>Evaluate understanding of energy-consuming devices comparisons</td>
</tr>
<tr>
<td>8</td>
<td>Which of the following is not a benefit of conserving energy?</td>
<td>Sustainability of the programme depends on students appreciating the benefits</td>
</tr>
<tr>
<td>9</td>
<td>A phone charger plugged into the socket will still consume energy even if it is not connected to a phone</td>
<td>Test students understanding that unplugged equipment consume energy – phantom load</td>
</tr>
<tr>
<td>10</td>
<td>Refrigerators should be installed close to the wall to prevent air circulation</td>
<td>Refrigerators – common appliance and significant energy consumer-basic knowledge required on how to reduce energy consumption</td>
</tr>
<tr>
<td>11</td>
<td>State two things you can do to reduce your energy consumption at home or school</td>
<td>Open-ended questions to gauge students’ knowledge of conservation strategies</td>
</tr>
</tbody>
</table>
school’s energy committee were trained on how to operate the meter to extract vital information on energy consumption. The energy committee can decide to expand the number of meters to provide data where necessary in the execution of their energy management programme.

Results

Assessing Students’ Awareness about Energy Conservation

A survey instrument was designed to capture the general level of awareness of the students. The survey instrument was administered to a sample size of 100 students randomly selected from various grade levels, representing approximately 5.7% of the student body. With a school population of approximately 1,800 students, the margin of error is approximately 10% for a 95% confidence level. Only 98 of the instruments were returned, representing 5.5% of the student population.

The data was analysed using Microsoft Excel analytical tools to produce tables and charts to investigate responses and identify possible relationships. The 11 questions on the survey instrument were given a value of one mark each. This allowed for a score to be given to each participant for selecting the correct answers. As a result, participants received a grade for the instrument out of a possible 11 total marks. It is understood that the score achieved by a participant can be used as an indicator of the level of awareness.

Prior to the survey, students were not aware they would be evaluated and as such, could not have prepared as they would have for an exam. The survey was administered like a test. The distribution of participants by grade level is shown in Figure 2. Because of the comparatively small number, students in grades 12 and 13, were evaluated as grade 12 students. The greatest number of participants were from grade 11, representing 22% of the total participants in the survey. For all other grades, participant participation was between 14% and 18%.

The survey revealed there is a general level of energy awareness in the school, with approximately 96% of the participants achieving a grade of 70% or more. Only 2% of participants received a grade below 50%. It must be considered that the low performers could be students who were absent at the time the awareness session was conducted. Students were randomly selected to complete the survey instrument. The average score achieved by the student body on the instrument was 87%. This further reiterates the high level of awareness present within the student body.
Furthermore, for question 11, students were asked to state two things they can do to reduce energy consumption at home or school. A wide variety of responses were submitted. The energy conservation strategy to turn off lights was the most popular response, with approximately 68% of students suggesting this strategy. Altogether, approximately 90% of students suggested turning off lights, televisions, fans and equipment as a strategy. Some students suggested unplugging equipment (21%) as a general strategy, while others were more specific to suggest unplugging phone chargers (12%). Of note, approximately 10% of students suggested one conservation strategy that was incorrect. There was no student who had suggested more than one incorrect response to this question.

**Future Impact on Energy Consumption**

It is generally expected that with the training of almost 1,800 students if each student trained shares the information in their community, energy efficiency practices will increase and extend beyond the borders of the school community. Should individuals apply the lessons learned throughout the training in their homes, they should be able to see a reduction in their residential energy consumption resulting in lower monthly bills. Consequently, implementing energy-saving strategies in schools and homes across Jamaica should result in a decrease in the country’s fuel imports.
Conclusion

Preliminary data from a monitoring exercise after the training showed a reduction in the school’s energy use by 16% when compared to consumption for years 2016 and 2017. However, further analysis is required to explicitly determine the extent to which the training intervention impacted the school’s energy consumption and the influence of other factors, which will form the basis for future study.

As a result of this project, the following were achieved:

1. An Energy Committee was established at the school with 17 members, including a member of the school’s board. The vice-principal was selected as the Energy Manager and Chair of the Energy Committee.
2. Capacity training to assist in the development and implementation of an Energy Policy was delivered.
3. An appropriate Energy Management Policy was developed.
4. Energy awareness and efficiency training was delivered to 100% of staff and student population.
5. Survey to determine the level of awareness was executed.
6. An energy monitor was also installed at the school to track real-time energy consumption.
7. A brochure condensing energy conservation strategies and benefits was distributed to all students and staff trained.

Lessons Learnt and Recommendations

This study was the first of its kind to be done in Jamaica and therefore served as the pilot for the planned expansion to other schools. As a result, the lessons learnt on the project are highlighted here for the benefit of future endeavours. The lessons listed below consider the varying aspects of the project executed by this project team.

1. Involving the school in all planning aspects of the project: The project team involved the school when planning all aspects of the project. This proved to be an effective strategy since the school was able to identify strategic dates for training to allow for minimum disruptions to their operations. Also, this allowed for the fostering of a good relationship with the school and the project team, which was critical to the success of the project.
2. Availability of Staff: There were some challenges in getting all the selected teachers and students to participate in the first two training modules for the
duration required. It must be paramount that all participants are able to attend the sessions and remain until concluded. Additionally, there should be someone at the school who is given responsibility for the project oversight before the start of the project to ensure all project related arrangements are executed.

3. **Sensitisation of all stakeholders:** The management of the school should ensure that all stakeholders, especially students and teachers, are aware of the project. The project team engaged in a sensitisation session of the school population through a 10 minutes presentation of an overview of the project at their general devotion. This proved to be effective, as the entire school was able to appreciate the activities of the project.

**Acknowledgements**

This work was carried out as part of a PetroCaribe Development Funded project at the Glenmuir High School in collaboration with the project team (trainers) from the School of Engineering, University of Technology, Jamaica. We are grateful to the PetroCaribe Development Fund for the opportunity to work on this project. We are also grateful to the Glenmuir High School for accommodating the project team and their enthusiasm towards achieving the project objectives.

**References**


A Constructivist Approach to Redesigning an Information Systems Innovation Syllabus: First Steps

LISA FACEY-SHAW, SOPHIA McNAMARA
University of Technology, Jamaica

Abstract

Constant changes in technology, changes in the approaches to new product and new system development, student feedback and the need for continuous review of syllabi have informed the need for changes to the rationale, content and delivery approaches used in an innovation course offered to upper-level university students primarily within an Information Systems specialization of a Computing degree programme at a university. The purpose of this article is to document the motivation, important considerations and proposal for the redesign, informed by existing literature, industry and discipline recommendations and best practices. A constructivist approach, with the lecturer to serve primarily as a facilitator in a student-centred environment, and with a focus on active and authentic learning, was adopted as the foundation for the redesign. The output is a proposed design to be implemented and evaluated in the future to assess students’ educational experiences with the redesigned course. This design will incorporate sessions focusing on idea generation and creativity, seek government and industry input for engendering innovation, include more active learning activities and authentic assessments, and reflect updated content emphasizing new ways of thinking.

Keywords: innovation, information systems, syllabus redesign, constructivist approach

Introduction

The four-year Bachelor of Science in Computing at the University of Technology, Jamaica includes a specialization in Information Systems (IS) pursued by students
typically within the third year of their programme. IS Innovation and Emerging Technologies, first offered in January 2012, is one of the courses within this specialization. Guided by the recommendations from the ACM/AIS IS 2010 Curriculum Guidelines for Undergraduate Degree in Information Systems (Topi et al., 2010), the course addresses the development and usage of IS innovations within an organisation and globally, and examines the role and application of current and emerging technologies.

The major units look at understanding IS innovation – processes, driving factors, theories, challenges and other dynamics; communication, collaboration and emerging technologies — factors leading to their development, their functions and their impact on business processes; impact of IS innovations on organisations – characteristics, culture, strategies associated with innovative organisations; and issues such as role of stakeholders in facilitating innovation and the impact of these innovations on the economy, society and the environment. Innovation is important within the field of information systems as graduates of these programmes should design, understand and demonstrate skills in exploiting and converting opportunities created by innovations in technology into organisational value (Topi et al., 2010). The course, taught over a 13-week semester, is also available as an elective for non-IS specialization students with the Computing degree programme.

Constant changes in technology, changes in the approaches to new product and new system development, student feedback and the need for continuous review of syllabi have informed the need for changes to the rationale, content and delivery approaches of this course. Jervan, Ellervee and Kruus (2011) suggested that in today’s world, young students should seek to acquire new ideas and business initiatives to survive and tackle globalization and other challenges through being innovative and learning entrepreneurship skills. In this article, we document the motivation, important considerations and proposal for the re-design of this course, informed by existing literature, industry and discipline recommendations and best practices. In addition to decisions about course topics, Fornaciari and Dean (2014) considered it important to also reflect on syllabus design. Documentation of syllabus design serves to assist educators and educational administrators in understanding any challenges and issues that may need to be considered at the design stage (Dodgson & Chambers, 2017) and provides useful recommendations that may help others to minimize design iterations.

The remainder of this paper is structured as follows. The next section provides a background to the course and the motivation for its re-design. Design considerations are then introduced, followed by a proposed design, conclusions and future work.
Background and Motivation for Redesign

The delivery of the IS Innovation and Emerging Technologies course adopts a lecture-based approach to provide coverage of the concepts along with supporting tutorials to facilitate interaction and discussion. Case studies and scenarios are often used to provide a real-world understanding of concepts, while lab sessions are used to develop student competence in using communication and collaboration tools. The resulting student contact hours are one hour for the lecture session, two hours for the tutorial and three hours of laboratory time (only 1 hour supervised). Coursework assessments, comprising 60% of the overall marks, include a discussion paper, theory-based test, lab project, case analysis and general class participation. Students also complete a 40% weighted final examination. The course is offered in the second semester of the academic year. The number of students that have taken this course averages around 40 per year. One large lecture session is usually scheduled with the group broken into two sessions to facilitate tutorials and labs.

The motivation for the redesign of the IS Innovation and Emerging Technologies course is due to several reasons. Internal and external quality assurance mechanisms require that our syllabi be periodically reviewed, understandably given the nature of our discipline and the need to provide students with a course that reflects modern content and approaches. The information systems field itself is in rapid, constant change due to the availability of new and emerging technologies being deployed or considered for deployment in organisations for sustainability and competitive advantage. New approaches and strategies to innovation, creativity and ideation in an era of disruption, bankruptcies, shortening new product development cycles and modern software development methodologies require a refreshing of the content and delivery approaches in preparing graduates for a changing workforce, and in some instances for future jobs which may not even yet exist.

Lecturer reflections, observations and student feedback have also contributed to several changes over the years. Students have at times complained about course workload, particularly for the lab project, which typically asks them to use communication and collaboration technologies to produce an innovative digital campaign. They are required to produce a deliverable each week, for example, a self-designed logo, an animation, commercial etc. culminating in the design of a website which integrates the work done throughout the semester. While students have generally enjoyed working on the lab project and have over the years produced some excellent campaigns, they have often protested the assessment weighting of 15%.
In recent years, the number of deliverables has been reduced; however, the question arises as to the continued relevance of attempting to develop student competence in the requisite skills being taught in the course. Over the years, the tech-savviness of students has increased, and we find that they are more adept, especially in the age of social media communication. Increasingly as well, existing web technologies have simplified the process of creating media such as websites, animations, images, etc. Thus, while students did not have to create these necessarily from scratch, the technical effort involved in their creation has lessened over the years.

Feedback from lecturers and students suggest that the inclusion of a final examination for a course of this nature is worth re-considering. In some areas of practice, upper-level courses tend to focus more on assignments than final exams (Dodgson & Chambers, 2017). Students have been generally successful at achieving the objectives for assignments such as the discussion paper and case analysis. General class participation in tutorials for the course has been very good, particularly for learning activities such as group conceptualisation of an innovative information system which is presented in the form of a pitch. For this activity, each group identifies a leader who becomes a part of the panel for the assessment of the pitches of the other groups to determine whether an investment would be supported for the idea. Their participation in this activity usually results in high levels of engagement, especially as their peers are responsible for determining whether the idea has the potential to be a success.

Another highly engaging activity is the requirement for individual student presentations on emerging technologies. For this activity, each student gives a presentation on an emerging technology that has not previously been presented by their peers. There is rich peer learning from this activity as students are usually not aware of most of the technologies presented. Other engaging activities include case discussions, video presentations with post-discussions and creativity activities. Attendance at lectures, however, which are usually less interactive, tend to dwindle over the semester. It is, therefore, evident that active student learning is necessary to enhance student engagement and participation in the classroom. This may require the course to take on a different structure than that which currently exists.

Other student feedback is the perception that the course should be done across the entire university and that more resources should be expended by the country to facilitate innovation. Altogether, these reasons have resulted in the current, timely holistic review of the syllabus to better serve the needs of students, industry and other stakeholders.
Design Considerations

There is a significant imperative to keep university level computing curriculum relevant and up to date. Internal and external quality assurance mechanisms, including requirements from accreditation bodies, also influence curriculum reviews. Such an imperative is also influenced by the constantly changing technologies and the need to produce work-ready graduates (Bridgstock, 2017). This prompts the need for timely reviews and evolutions of curriculum (Landwehr et al., 2016). Notwithstanding, several factors must be considered during the process of curriculum review and updates. Some considerations include the content, the context and purpose of the course, the learning objectives and expected outcome, active learning strategies, resources and tools.

According to the principles of the Triple Helix system, economic development and innovation are enhanced by a synergistic relationship between institution and individuals within three spheres namely university, industry and government (Ranga & Etzkowitz, 2013). This kind of synergistic relationship helps to provide context for the course, and it models the behaviour of the institutions and actors that help to engender innovation. A number of issues become evident. For instance, although the university has the capacity to provide students with new skills and ideas, it cannot do so in isolation. In the context of the course under review, this points to the need for collaborative input from other innovators in business and government. On the ground, in terms of implementing the course, this means the inclusion of guest lecturers/innovators but can also mean physical and virtual field trips local and abroad since innovation has no physical boundaries. This can be cost-effectively achieved using appropriate technology.

A second issue is that research and development (R&D) is not the only means of innovation (Ranga & Etzkowitz, 2013). Other means of producing innovation include imitating technology, adopting technology, implementing incremental changes, “leap-frogging” and using current knowledge in new ways (Ranga & Etzkowitz, 2013). This points to a diverse outlook in the course on innovation strategies and even extending analysis to show how innovation can fuel economic growth and job creation. This kind of a diverse perspective can also serve to widen the contextual view of the course and make it suitable for a university elective and summer course for companies wishing to engender innovation in their organisations.
A Constructivist Approach

The constructivist theory of learning posits that students build knowledge and meaning from their experiences and that they learn by linking new knowledge and ideas to what they already know, thereby extending their understanding (Bada, 2015; Brame, 2016; Brandon & All, 2010). Active learning is based on this theory. Active learning entails thoughtful participation and effort by students to build their understanding and knowledge of the subject area (Brame, 2016; Roehl et al., 2013). The effort is usually in response to the strategies used by the teacher-facilitator. The idea is that students are no longer passive participants. It involves instructional activities that encourage and allow students to think and process information and to actively participate in their learning (Brame, 2016; Roehl et al., 2013). Active learning develops the students by building their higher-order thinking capacity (Brame, 2016; Brandon, 2016). However, active learning requires more effort on the part of the lecturer since it requires guided activities which focus on the learning objectives.

Ito (2017) proposed that active learning should be considered as a pedagogical methodology rather than just methods since it provides a complete framework of teaching and learning. In fact, several teaching approaches such as problem-based, project-based learning, collaborative and cooperative learning can be used in active learning instructional strategies (Ito, 2017). In addition, Ito (2017) argued that as long as learning happens in any mode, (be it passive, active, constructive or interactive), at any level (be it cognitive, behavioural, emotional & motivational) of engagement, then it is considered active learning irrespective of the instructional method.

Why then is active learning so important in the innovation curriculum? Recall that active learning promotes higher-order and critical thinking (Brame, 2016; Skalnik & Skalnik, 2012). Furthermore, many students prefer active learning techniques and students may have learning styles better suited to active learning techniques rather than lectures (Skalnik & Skalnik, 2012). In addition, according to Ito (2017), active learning promotes discovery skills. Discovery skills, (also called innovation skills), are employability skills that work universally and are essential for innovation (Ito, 2017). Active learning also enables students to be proactive; innovation and proactivity are necessary for company survival (Ito, 2017).
Authentic Learning

Authentic learning focuses on learning within contexts which allow for the direct application of concepts to the real-world (Rule, 2006). In a qualitative analysis of literature relating to authentic learning, Rule (2006) identified four commonly occurring themes as (1) real-world problems which mimic professional work; (2) open-ended inquiry activities which address thinking skills and metacognition; (3) student engagement in a community of learners; and (4) student empowerment through choice to direct their own learning. Characteristics of authentic activities, posited by Herrington, Oliver and Reeves (2003), include activities matching real-world professional rather than classroom-based tasks, ill-defined and complex tasks, but allowing students to come up with a range of solutions, as well as activities that facilitate collaboration and reflection.

The classroom environment in programmes such as art and design tend to mirror a design studio environment to prepare students for entering the industry (Sinfield & Cochrane, 2018). Innovation courses, which are often inextricably tied to entrepreneurship education, should also demonstrate similar mirroring. For example, entrepreneurship education tends to include experiential learning opportunities which are designed to foster students’ entrepreneurial mindsets and teach them how to think, ultimately contributing to the building of entrepreneurs in the society (Sá & Kretz, 2015). Some of these activities, as discussed by the authors, include boot camps, hackathons, and business model or elevator pitch competitions. While these activities may also form part of extra-curricular programmes, this mirroring of the environment through which entrepreneurship can be fostered should also be true of innovation education. Monds (2015) recommended exposing students to learn startup principles, iterative design and design thinking as part of the continuous improvement activities for higher education institutions. Given that the course content introduces concepts on user-led innovation, and the linkages between technology entrepreneurship and innovation, course content and activities which include these principles may be beneficial to students who we hope will engage in business startups.

21st-Century Learning

As discussed by Kivunja (2014), the Learning and Innovation Skills domain within the Framework for 21st Century Learning¹, comprises the 4Cs, critical thinking

¹. http://www.battelleforkids.org/networks/p21
and problem solving, communication, collaboration, and creativity and innovation skills. The author argued that these skills should be explicitly and effectively taught and should include strategies which help learners to acquire, sift through and be open-minded towards information and knowledge; to articulate thoughts in various forms and through practical exposure to varying technologies; and to work in teams, reflect on tasks and share progress feedback. For the creativity and innovation skills, Kivunja (2014) suggested strategies of helping learners to solve real-world, challenging problems which allow them to go through trial and error situations, including failure, all of which help to model the creative and innovative processes.

In Fornaciari and Dean (2014), the authors discussed why a 21st-century syllabus should be reframed to focus on andragogical principles for today’s digital learners. The authors examine how these andragogical principles such as learning through trial-and-error, relevant, problem-based learning and facilitating ownership of decisions about learning can bring about improvements in student performance, satisfaction and learning outcomes as learning takes on a partnership approach with the student and instructor. These principles are consistent with the strategies earlier discussed.

To conclude this section, we have made considerations of various factors in an effort to redesign the IS Innovation and Emerging Technologies course. The factors are by no means exhaustive but have given us a good start with which to embark on a new iteration of the course. The approach to the course redesign involved a detailed review of the current syllabus, evaluation of student comments on instructor-course evaluation forms over subsequent periods, review of literature related to innovation and constructivism, as well as professional curriculum recommendations, instructor observations, and an assessment of informal student feedback. We present in the next section features of the redesigned course, which reflect the considerations above.

**Proposed Design**

Based on the preceding, we consider the following as important features to be characteristic of our syllabus redesign and provide examples of how they can be incorporated.

1. **Redesigned structure.** We propose the removal of lecture sessions and recommend that the theory be integrated into the tutorial sessions. The tutorial sessions will continue to facilitate case analyses and discussions,
students’ presentations, etc. We also advocate for the removal of the lab sessions and instead propose workshop sessions which can facilitate idea generation, creativity exercises, industry guest presentations, boot camps and other such activities. As suggested by Kinniburgh (2010), students should explore and be flexible in their approach to learning rather than be constrained to traditional methods focusing on direct dissemination of content. It is recommended that two hours be allocated for the tutorial and two hours for the workshop session. The physical arrangement of the room, particularly for the workshop session, is critical to fostering a climate of idea generation and creativity; thus the plan is to work with the scheduling officers and administrators to see how this can be facilitated. A newly installed innovation lab could also potentially serve as a creative space for engendering ideas.

2. **Involvement of government and industry.** In the current course, at least one lecture session is dedicated to a presentation from an industry representative. We propose more involvement of industry partners, especially for activities such as boot camp sessions and elevator pitches. More focus will be placed on how to engender public sector innovation and the role of government in facilitating innovation, particularly given our developing country context.

3. **Inclusion of more active learning activities to reflect the constructivist approach discussed earlier.** These activities can facilitate critical thinking, problem-solving and decision-making, key aspects of a constructivist approach (Neutzling, Pratt, & Parker, 2019). While we do not seek overkill, the new structure of the course will facilitate the inclusion of more activities which can elicit the skills being promoted and increase student participation and engagement. Relevant case studies, for example, which can be applied to particular situations, are recommended under a constructivist approach (Kurt, 2011).

4. **Inclusion of more authentic assessments.** The final examination component will be replaced with an assessment more reflective of innovation practice. Class participation will take on new forms, particularly with the suggested workshop activities. Students will still be expected to research and articulate viewpoints culminating in a discussion paper to build their communication skills, in addition to pitch sessions. Projects to facilitate the building of team skills will also be included with the opportunity for student reflection. Students’ creativity can also be increased through a challenging design problem which requires them to determine alternative solutions (Kurt, 2011).
Critical reflection about their learning activities are also important (Kinniburgh, 2010; Kurt, 2011). Assessment weightings are to be determined subject to the university’s testing and assessment policy.

5. **Updated content.** This is expected with every iteration of a syllabus, especially given the nature of the discipline. Professional and industry recommendations to course content will be considered, in addition to textbooks and other resources. Lean startup principles, ideation and new ways of thinking are some of the content areas that will be reflected. Fund-raising and venture capital were recommended concepts in an Innovation and Entrepreneurship module, albeit at the Masters level, to encourage students to become entrepreneurial and more innovative (Jervan, Ellervee & Kruus, 2011).

To operationalise these recommendations, the syllabus will be reviewed and revised accordingly to reflect the new content, assessments and learning activities. Collaborations will be sought with industry and government representatives for their participation. Ongoing monitoring and evaluation will take place during the implementation of the redesigned syllabus to make interventions, where necessary, and to form a basis for iterative design.

**Conclusion**

An integral part of reflection on teaching and learning is reviewing course curriculum and redesigning where needed. Feedback from participants in the teaching and learning process is important, but it must also be juxtaposed with relevant elements from the course context. These may include consideration of how a course fits into the overall framework of the degree, its primary objectives, up-to-date content, teaching, learning, and engagement strategies.

We set out in this article is to document the motivation, important considerations and proposal for the redesign of an upper-level course, IS Innovation and Emerging Technologies, offered within the Information Systems specialization of a four-year Bachelor of Science in Computing at the University of Technology, Jamaica. The redesign was informed by existing literature, industry and discipline recommendations and best practices. An important component of the considerations for an improved design included a review of the constructivist approach to learning, in particular, strategies for active and authentic learning. Given today’s digital learners, we also considered the 21st-century skills required, particularly as it relates to creativity and innovation, which are closely aligned to the skills to be developed in the course under review.
The result is a proposed redesign featuring components to be incorporated into the next offering of the course, subject to approval from the relevant approval committees. The proposed design will incorporate sessions focusing on idea generation and creativity, seek government and industry input for engendering innovation, include more active learning activities and authentic assessments, and reflect updated content emphasising new ways of thinking. After implementation, the course will be evaluated to assess students’ educational experiences with the redesigned course. We consider this an important first step in the redesign process as we seek to build active student participation in the learning process. Considerable effort will be required to plan and guide the proposed learning activities; however, the implementation is expected to provide an enriched, relevant learning experience for the students as we prepare them to enter into the working environment.

The redesign process is an iterative one and may require improvements along the way but each iteration bringing us closer to a model syllabus that can be beneficial to educators in the field and to industry stakeholders who are looking for well-prepared students who can assimilate quickly into the workplace.

**Future Work**

Our next steps involve finalising the syllabus design in light of the active learning strategies and authentic learning assessment tasks earlier discussed and obtaining approval for its implementation within the curriculum. The goal is to implement the course within the next academic year, evaluate the implementation to assess students’ educational experiences with the redesigned course, and conduct more design iterations, if necessary, to ensure that students are provided with rich learning opportunities to achieve the skills and competencies required of the course.
References


A Qualitative Study on Exploring College Instructors’ Integration of Technology in their Content Area Curricula

JUNIOR MARTIN
University of Technology, Jamaica

Abstract

Technology integration into the curriculum remains a challenge at different levels of the education system. In higher education, the expectations are that teacher training institutions should lead the process of preparing pre-service teachers to integrate technology in the classroom. This paper describes instructors’ readiness to integrate technology in the curriculum for pre-service teachers and presents an intervention to address weaknesses identified among the teachers. The intrinsic case study involved a total of 13 instructors from one Faculty who were purposefully selected to participate in the study. Data collection strategies included interviews, observations, and review of documents. Data analysis was done using both the topological and inductive methods. The study results were analyzed based on the themes generated from the data collection. Factors such as the philosophy of instructions, technology support and the methodologies employed by the instructors impacted the rate of success achieved during technology integration in the curriculum. The extent to which technology integration is utilized by instructors is therefore a major influence during its implementation. The study presents a professional development programme in the form of workshops to build the competencies of the instructors in the field of technology integration.

Keywords: technology integration, TPACK model, technology literacy, technology application tools, professional development
Introduction

One of the developments related to access to technology resources in the classroom is the increased opportunities available to teachers to integrate technology at the different levels of the educational system globally (Johnson, Jacovina, Russell, & Soto, 2016). In light of this development, efforts are being made to renew the focus on gaining increased access to technology in the classroom and extending this technology use (Daves & West, 2014). The successful integration of technology is therefore highly dependent on the degree to which instructors and students have access to educational technologies. It is becoming commonplace for institutions to utilize technology for instructional purposes and place more emphasis on implementing technologies to effectively improve instruction and facilitate learning (Davies, 2011). The extent to which these factors are successfully addressed could determine how instructors effectively integrate technology in their content area curricula.

The focus of this study is on the one, central phenomenon of technology integration into college classrooms. Creswell (2009) stated that this one central phenomenon should be a short phase focusing on one idea. The phenomenon of technology integration into college classrooms will be the focal point to align the elements of this study.

Chancellor’s Institute (CI) is a four-year college located in the Caribbean. It is the site of this study. This institution has a student population of approximately 2,500 students and a faculty of 120 instructors. The institution offers both full-time and part-time programmes at the bachelor’s and master’s degree levels in the area of teacher training. Students enrolled in these programmes are trained to teach at the early childhood, primary, and secondary levels. All the programmes are offered face-to-face in the Faculty of Education, Faculty of Humanities, and the Faculty of Science and Technology. The graduate school manages all graduate programmes. Instructors are encouraged to integrate technology in their teaching in an effort to engage their students meaningfully.

The results of a survey to determine the instructors’ readiness in the area of methodology and technology integration indicated that 35% of the instructors at CI have demonstrated the required competency. In response to the results of the survey, the Vice President of Academic Affairs at CI expressed concerns at the large number of instructors who failed to meet the required competency (Doe, D., personal communication, August 29, 2013). Due to low levels of technology integration into the curriculum by instructors at CI, there is the need for additional research in the field (Hutchinson & Reinking, 2011).
Purpose of the Study

The main purpose of this qualitative study is to explore how college instructors’ integrate technology in their content area curricula.

Significance of the Study

The results of this study may provide insights into strategies that can be employed to increase instructors’ integration of technology into their classrooms at CI. Insights from this study could assist college instructors to develop a greater awareness of the value of integrating technology into their classrooms.

According to the findings from this study, the participants required professional development training in an effort to improve their competences in technology integration. They identified the need for additional training as one of the major interventions that could satisfactorily address their weaknesses in technology integration. The overuse of PowerPoint and limited use of web-based tools by some participants were examples of the weaknesses that will be addressed in the professional development workshop. Targeting the integration of modern technology tools such as Prezi, wikis, Webquests, storyboards, social learning tools, and multimedia learning tools will provide the participants with the required foundation to successfully integrate technology into their curricula.

Research Questions

In alignment with the research problem and purpose, the following research questions were posed:

1. How does a group of college instructors from the social sciences department at CI describe the integration of technology into their classrooms?
2. How does a group of college instructors from the social sciences department at CI demonstrate the integration of technology into their classrooms?
3. How does a group of college instructors from the social sciences department at CI document the integration of technology into their classrooms?

Literature Review

The use of technology in the classroom can be grouped into broad categories. The main categories of technology that can be used to create a foundation for
technology integration are technology for planning and production, technology for instructional delivery, and technology as a learning tool (Hughes & Read, 2018). Proper planning and expert delivery by instructors can establish a foundation to guide the evaluation of technology literacy (Adil, Izhar, & Abdul Taber, 2016; Davies, 2011). In the model, Davies (2011) outlined a road map for evaluating technology which has facilitated the processes of gathering, organizing, analyzing, and reporting of information regarding the use of technology in the classroom. The evolution of these categories and subcategories provide clarifications to the process of technology integration and creates opportunities for further evaluation of its implementation.

The evaluation of technology integration has provided a way to examine how instructors use technology as a main planning and delivery tool to benefit their students. Analyzing technology integration, with a focus on its evaluation, creates a broader perspective on which planning, delivery, and evaluation of technology integration can be done successfully (Davies, 2011; Adil, Izhar, & Abdul Taber, 2016). The categories associated with technology integration could provide more detailed information on the benefits of technology integration to instructors, their students, and other stakeholders. An examination of previous and current research on the benefits of technology integration can be one effective way of evaluating the effects of technology integration on the classroom environment.

There are several benefits of technology integration for students. In this study, the benefits discussed include student engagement, motivation, and improvement in academic performance, productivity, and class participation. The extent to which the benefits of technology integration has influenced the implementation of technology integration has contributed to the positive outcomes experienced by instructors and their students participating in the process (Davies, Dean, & Ball, 2013; Francis, 2017). An in-depth examination of different strategies used to achieve these outcomes, such as meaningful engagement, positive motivation, and the achievement of tangible outcomes, are associated with the benefits of successful implementation of technology integration (Fancis, 2017). There is an expectation by scholars in the field of technology integration that the information ascertained on the benefits of technology integration can guide instructors in their efforts to become more successful in their efforts to inspire student success in the classroom.

The relationship between student engagement and technology use continues to be analyzed by scholars in an effort to provide additional information on the impact of technology integration in the process of teaching and learning. There is a positive association between student engagement and technology use in the classroom (Gebre, Saroyan & Bracewell 2014; Gunuc & Kuzu, 2015; Kay & Pasarica, 2019).
Supported by the use of campus-class-technology (CCT) theory, Gunuc and Kuzu (2015) highlighted the importance of technology use in the association between campus engagement, class engagement, and successful student outcomes. Gunuc and Kuzu explained that the value given by university students to their university life and their education was dependent on factors such as the time they spend on campus and effective technology integration. Gunuc and Kuzu explained that these factors contributed to improvements in the students’ level of academic achievement and positive learning outcomes. The application of a modular approach in the analysis of the relationship between student engagement and technology integration can provide further analysis of the role of students’ interest in the process of successful collaborative learning. The provision of the necessary technology resources to facilitate student engagement is critical for technology integration to support a successful instructor-student interaction.

Class environments that create opportunities for students to be involved in hands-on activities are an effective way of encouraging successful student engagement. The implementation of the 1:1 Laptop Initiative, a national teacher-level survey during 2008 and 2009, demonstrated that technology integration supports student engagement (Dowes & Bishop, 2015). The United States Department of Education (2010) published a comprehensive report on teachers’ use of educational technology in U.S. public schools. Data collected, analyzed, and reported by the National Center for Education Statistics (2010) on the Laptop Initiative showed that 94% of the K-12 instructors reported that students used the Internet, and 63% of the teachers indicated that students used software for making presentations (Dowes & Bishop, 2015). Dowes and Bishop explained that 83% of the teachers reported that their students used educational technology during classes, while 36% of their students designed multimedia presentations. These statistics support the implementation of the integration of technology into the curriculum.

Exploring the association between technology and motivation is valuable to the analysis of technology integration in the classroom. Technology integration can motivate university students to achieve greater academic gains while they learn course content at their own pace (Davies, Dean, & Ball, 2013). To achieve this outcome, the establishment of a technology culture model by instructors (Kaur & Noman, 2015) should characterize the implementation of technology integration. The successful implementation of this model rests on its design within a specific structural context, such as employing a specific model. Huffman and Huffman (2012) presented the technology acceptance model (TAM) as an intervention designed to assess the level of motivation students experience following effective
technology integration. The basic component of the TAM is the assessment of the ease of use and perceived needs of users of technology. The ease of use and perceived needs are usually two motivators which affect students’ likelihood of using technology (Cheung & Vogel, 2013; Teeroovengadum, Heeraman & Jugunath, 2017). In assessing the perceived usefulness of technology by college students, institutions have recognized that students who readily identify the benefits of using technology are more motivated to use technology more frequently (Huffman & Huffman, 2012; Yu-lin, 2015). The process of applying the TAM to inspire motivation among students during the implementation of technology integration can be considered as a timely intervention. The execution of TAM could provide more meaningful information on the association between synthesis motivation and successful technology integration.

The ability of instructors to use technology integration effectively to facilitate improvements in students’ performance has emerged as a major area of interest in the area of teacher training (Sung & Hwang, 2013). The shift toward a student-centered learning environment has provided students with authentic learning experiences where collaboration and the development of critical thinking and problem-solving skills create the important link between technology, pedagogy and content (Giraldo-Garcia, Roy & Alotebi, 2017). The magnitude of the impact of the student-centered approach on technology integration is a testament of a rise in the use of modern instructional strategies during technology integration (Baharin, Kamarudin & Manaf 2018; Ertmer & Ottenbreit-Leftwich, 2013). This paradigm shift has contributed to improvements in students’ academic performance while making a case for the integration of technology into different curricula.

The extent to which instructors are able to be productive and maximize the benefits of class participation can be attributed to the use of new technologies such as multimedia. The multimedia nature of technology integration has created opportunities for students to be focused during their learning and improve their participation in in-class activities (Ruggiero & Mong, 2013). The interventions of multimedia technologies have contributed to the transformation of the teaching and learning process (Ruggiero & Mong, 2013; Zhang, Zhang & Yang, 2016). The use of new technologies, including multimedia, to transform the technology integration process has been a major achievement in the field of education (Adair-Hauck, Willingham-McLain, & Earnest Youngs, 2013). Modern multimedia applications in the classroom, such as PowerPoint, Prezi, Smartboards, web-based programmes, and other contemporary tools, have revolutionized pedagogy in colleges and universities. The continuous evolution of these interactive applications has created a platform for students to participate in project-based activities, thus
collaborating with peers both locally and internationally, and becoming more creative in their theoretical and practical activities.

Barriers to technology integration can be classified as obstacles that pose significant hindrances to the successful implementation of technology integration in the classroom. The classification of barriers to technology integration into first-order, second-order, and third-order barriers provides a platform on which the impact of these barriers can be analyzed (Prestidge, 2017). The first-order barriers are external to the instructor and include factors such as hardware and software resources, training, and support (Kaur & Noman, 2015). Teacher confidence, beliefs, knowledge, and skills that are internal to instructors are known as second-order barriers (Prestidge, 2017). Third-order barriers are classified as a lack of design thinking by instructors (Prestidge, 2017). Addressing the challenges to overcome these barriers has significant benefits. These benefits include institutions providing the required resources and instructors becoming competent enough to execute technology integration successfully into the curriculum.

Identifying the specific barriers to technology integration could provide answers to approaches employed by instructors during the implementation of technology in the classroom. Ertmer et al. (2012) determined from a survey that the primary barriers affecting the successful integration of technology are the first-order barriers. Using a multiple case study approach, the 78 participants responded to Ertmer et al.’s structured interview questions related to insights on their beliefs that supported their practice. The authors of the study recommended that increasing the instructors’ knowledge and skills have the potential to encourage the instructors to implement technology integration. The relationship between the instructors’ practices and their beliefs contributes significantly to their decisions to use technology in meaningful ways to support their pedagogy (Jamalzadeh & Shahsavar, 2015). Instructors who practiced technology integration in the classroom could benefit from appreciable experience by carefully analyzing the potential barriers within their local environment. Instructors who are more knowledgeable about the barriers to technology integration are poised to conduct a more effective analysis of the impact of the barriers of technology integration on their pedagogy.

Evaluating the barriers to technology integration can be considered as one meaningful intervention instructors can practice as a strategy to build their competencies about technology use. The most common factors influencing instructors to use technology in colleges and universities are access, vision, instructor beliefs, time, and professional development (Islim & Cirack, 2017; Roofe & Miller, 2013). Based on the responses of 42 instructors who participated in the four-year comprehensive school reform programme funded by the United States
(US) Department of Education, barriers to technology integration have contributed to their unsatisfactory experiences while implementing technology integration (Sulaiman & Dashti, 2018). The evolution of common barriers to technology integration, such as instructor beliefs and confidence, access, time, and lack of professional development, has made the implementation of the process more challenging to instructors (Kelly, 2015; Roofe & Miller, 2013). This development has brought into focus the need for institutions to adequately address these barriers in an effort to empower instructors. This could be achieved through the provision of the necessary tools, knowledge, and experiences to successfully implement technology integration. Once this objective is achieved, instructors can spend additional time on making improvements in students’ academic performance and other meaningful learning outcomes.

**Conceptual Framework**

Two conceptual frameworks guided this study. These include the evaluation of educational technology developed by Davies (2011), and the technological, pedagogical, and content knowledge (TPACK) model by Berrett, Murphy, and Sullivan (2012). These frameworks were selected based on their influence on the successful implementation of technology integration. Both frameworks were designed to guide the collection and analysis of the data for this study.

The framework for evaluating educational technology integration includes a continuum on which an understanding of technological literacy exists. The three levels that characterize the continuum are awareness, praxis (i.e., training), and phronesis (i.e., practical competence and practical wisdom; Davies, 2011). The levels on the continuum are a representation of the highest levels of technology literacy learners could achieve based on their interaction with available technology tools and practice during technology integration (Davies, 2011). The levels on the continuum constitute three dimensions of the critical actions required by instructors during their evaluation of the process of technology integration (Dush, 2014). Because instructors are expected to successfully execute a proper evaluation of technology integration, their competence in the awareness, praxis, and phronesis as levels to be achieved during their implementation of technology integration is critical. Knowledge of the evaluation of technology integration is an important element in the analysis of the ability of participants in this study to successfully infuse technology in their lessons.

The TPACK model was chosen to guide the process of analyzing the details of the approach taken by the instructors during the integration of technology into
their curricula. The TPACK model is a theoretical framework designed for understanding instructor knowledge required for effective technology integration (Celik, Sahin, & Akturk, 2014). The model is comprised of three basic components: technology, content, and knowledge (Celik et al., 2014). The relationship among these components is an important element in the effective integration of technological devices along with the use of appropriate teaching strategies (Celik et al., 2014; Koh, Woo, & Lim, 2013; Voogt et al., 2013; Wu, 2013). The TPACK model is important in the era of modern technologies, content and pedagogy (Celik et al., 2014). Using the TPACK model as a reference during the integration of technology can establish the framework on which the implementation of the process of technology integration can take place.

Method

In this study, the choice of the case study design was determined by a number of factors including its practicality, the location of the data source, ethical issues such as interviewing my colleagues, data handling and record-keeping that may arise, and the context of investigating a contemporary phenomenon in a real-life context (Bogdan & Biklen, 2007; Merriam, 2009). The qualitative methodology allowed the collection and analysis of data obtained from all the respondents. It provided an in-depth understanding of the case through the collection of multiple forms of data, increasing credibility through the triangulation of the descriptions and interpretations are characteristics of case studies that influence the choice of design (Creswell, 2012; Stake, 1995).

Population and Sample

The participants of the study were instructors involved in the process of integrating technology into their curricula. A total of 13 participants in the faculty of humanities and liberal arts at the participating college were purposefully selected to participate in the study, based on their unique attributes (Merriam, 2009). This sample size was chosen to facilitate redundancy and saturation during the study, meeting the requirements for the development of a community of practice (Stake, 1995). Furthermore, purposeful sampling was used to select the participants in an effort to ensure that their characteristics appeared in a similar proportion that they appeared in the population of participants at CI (Bogdan & Biklen, 2007). Specifically, homogeneous sampling was used because the participants were members of the same department and taught similar subjects (Hatch, 2002).
were from the social sciences department, which consisted of 15 instructors – the largest group of full-time instructors who teach similar subjects and share similar classroom resources at CI. The other departments at CI consisted of an average of 10 full-time instructors; therefore, selecting instructors from these departments would not guarantee the participation of at least 10 instructors.

Data Collection

The methods of data collection for the study included interviews, observations, and documentation. The data collection methods helped to answer the stated research questions (Creswell, 2012). According to Merriam (2009), interviews, observation, and documentation are the primary methods of data collection used in qualitative research. These data collection methods were chosen because they were in alignment with the conceptual framework, the problem, and the research questions of my study.

Interviews. During the interviews, the participants provided detailed descriptions of data related to their use of technology. The participants’ experiences were explored and interpretations to uncover the meaning of the structures related to the problem of the study were used (Hatch, 2002). The face-to-face interviews of the participants were used primarily to answer the research question of how college instructors described the integration of technology into their classrooms. One-to-one, audio-recorded interviews were conducted with each participant.

The interview protocol was designed to provide consistency in the responses of each participant. The interview protocol contained nine semi-structured questions. The first four interview questions were related to the participants’ personal view of technology integration, while the other five targeted the actual integration of technology into the classroom by the instructors.

Observations. An additional method of data collection used in the study was observations. The aim of conducting observations of the participants’ teaching was to understand the phenomenon being studied as demonstrated by the participants in the classroom setting (Hatch, 2002). The observations were used to explore how the participants integrated technology into their classrooms, as well as to verify and provide a deeper understanding of the meaning of the information gathered from the interviews of the participants (Creswell, 2012). Each participant was observed teaching one three-hour lesson.

Documents. The third source of data for this study were document reviews. The latter provided valuable information that assisted in the understanding of the central phenomenon of the study (Creswell, 2012). The research question associated
with documentation concerned how the participants documented the integration of technology into their classrooms. The documents examined during the study were the participants’ plans, the strategic plan for the institution, and the minutes of meetings held by the social sciences department. These documents provided insights into the system that facilitated the extent to which the participants used and documented technology integration.

The schedule for the interviews was confirmed with the participants, and the interviews were conducted during lunch intervals and at the end of classes. All interviews, except one, were recorded using an audio recorder. One of the participants refused to be recorded, resulting in detailed notes being taken during that interview. The participant refused to be recorded because he was uncomfortable with the process.

Ethical Issues

The methods of data collection for the project study included interviews, observations, and documentation. They were chosen because they were in alignment with the conceptual framework, the problem, and the research questions of my study. The Institutional Review Board (IRB) of a US-based university and the institution where the data were collected required written permission to conduct the study. Once the relevant IRB approval was received, written correspondence was presented to the vice president of academic affairs, which included the request for permission to conduct the study, the required time to conduct the interviews and observations, and information related to how the data collected would be used.

The data collected for the study were kept on a personal, password-protected computer and an external hard drive. The information provided by the participants was kept confidential and maintained using a system of numbers (0001, 0002, 0003, etc.). A transcription service was engaged in transcribing the interviews, and the company signed a confidentiality agreement. All documents, including the signed consent forms, interview transcripts, and other paper materials related to the study have been housed in a locked cabinet at my home and will remain so for five years. They will be deleted at the end of this period in an effort to prevent any uncontrolled access. These security measures were instituted to protect the privacy of the participants and their data. Furthermore, specific safeguards were enforced, including the enforcement of the IRB of Walden University guidelines for user access to the data.
Data Analysis

The two methods of data analysis used were typological and inductive. The typological analysis involves dividing the data collected into categories based on predetermined typologies (Hatch, 2002). Inductive analysis is a search for patterns of meaning in data so that general statements can be determined from such data (Hatch, 2002). The questions in the interview protocol were derived from research question one. Following the transcription of the interviews, the participants were given copies of the written transcripts to verify the contents.

**Typological analysis.** The typological analysis was done using Hatch’s (2002) model to make the categorizing of data easier. The main typologies were selected from the three levels identified on the continuum for understanding technological literacy and the main components of the TPACK model outlined in the conceptual framework. The three main typologies were awareness, praxis (training), and phronesis (practical competence and practical wisdom), and they are considered as characteristics for evaluating technology integration (Davies, 2011). The other topologies were from the TPACK model and included technological knowledge, pedagogical knowledge, and content knowledge (Berrett, Murphy, & Sullivan, 2012). These typologies were selected based on the need to assess the level of the participants’ capabilities to integrate technology into their teaching. The typologies provided a framework on which the main themes could be established and provided the basis for generating the minor themes.

**Inductive analysis.** The application of the processes of inductive analysis is a description of the detailed analysis of the data collected during the study. This approach to data analysis facilitated an examination of specifics within the data and allowed the presentation of such information as general explanatory statements (Hatch, 2002). During the process, the interview transcripts were prepared in a common format, separating the interview questions from the interviewees’ responses using Microsoft Word. All the transcripts were formatted similarly using the same font size, margins, and so on. The transcripts were then saved to the external hard drive before they were printed.

The emerging themes were assigned a code to make sense of the data, and they provided a context in which the categories were organized. The choice of categories was based on the frequency of the occurrence of common information shared by the participants. The revision of the codes continued with the combination of categories until a smaller number of categories were selected. This was done in order to prevent overlapping and redundancy among the categories.
Once the typologies were identified based on the research questions, the main themes were identified. Linking the main theme with the meaning of the specific typology, determined the relationships between the main themes. Subsequently, patterns supported by data from the interviews, and the observations were presented. The supporting data was a description of the evidence presented by the participants. A summary of the inductive analysis process is captured in the Appendix, which shows the relationships between the research questions, the typologies from the research questions, and the main themes generated from the typologies.

The process of composing the data together to make some meaning of its interpretation was dependent on the application of the process of triangulation. The triangulation activities involved the corroborating of evidence from different types or methods of data collection in an effort to validate the findings (Creswell, 2012). The use of interviews, observations and documentation as methods for collecting data was, therefore, one way of establishing the validity of the research findings. This method allowed the corroboration of data collected from the interviews, observation, and documentation (strategic plans, instructors’ plans, and notes from staff meetings). The observations were conducted to make comparisons with the information provided by the participants in the interviews. The contents of the participants’ plan and meeting notes presented a comparison of data collected from the interviews and observations. The section of the institution’s strategic plan that provided a description of technology integration within the institution was used as a reference to compare the practices of the participants in relation to the targets established by the institution.

Specific procedures were applied to strengthen the quality of the findings of the study. These procedures included member checking, triangulation, and peer debriefing. The participants validated the accuracy and completeness of the findings by reviewing the draft findings sent to them by e-mail. Each participant received a copy of the transcription of the interview to validate the information. The feedback provided by the participants was used to make corrections to those transcripts that had errors. Consequently, this form of member checking provided evidence of the quality of the findings (Creswell, 2012). The different efforts applied to achieve accuracy and credibility of the findings of the study contributed to the value of the data analysis.
Discussion

Several themes emerged from the data analysis, which highlighted the description of technology integration by the participants. These themes included the impact of technology integration on teaching, students’ abilities to integrate technology, and tools and applications used by participants. The themes provided answers to research question one, “How does a group of college instructors from the Social Sciences department CI describe the integration of technology into their classrooms?”

There were three themes emerging from the data analysis that supported research question two, “How do the participants demonstrate the integration of technology into their classrooms?” These themes were the philosophy of participants, technology facilities and technology support, and methodologies used by participants. Based on the responses of the participants to the interview questions, the observation of their lessons, and the analysis of documents, the participants were consistent in their use of technology during their teaching. Another major finding of the study was the philosophy of the participants that was directly related to the extent to which they used technology in their teaching. Participants who had a positive view of technology integration used technology more frequently than their colleagues who shared negative views. The final research question, research question three, “How do the participants document the integration of technology?” was supported by four themes. These themes were training and preparation of participants, challenges faced by participants and their students, tools and applications used by students, and the participants’ perceptions of technology integration. The absence of training opportunities in the area of technology integration was identified by the participants as a major factor preventing them from integrating technology sufficiently. This affected their abilities to sufficiently plan lessons using technology integration strategies. While the institution identified training in technology integration as a major target in their strategic plan, there was no evidence of the manifestation of such training.

The utility of technology integration and the supervision of the process were the discrepant cases emerging from the data analysis. The utility of technology integration by participants and their students could be considered as having a major impact on the implementation of technology integration by being a necessity for users. The supervision of technology was perceived as an important element of the process that needed to be adequately managed. Based on the impact of the utility of technology and supervision of the process on the possible outcomes of
technology integration, both cases could be considered as elements of the conceptual framework for technology use.

**Conclusion**

The limitations experienced by the participants in their attempts to integrate technology into their curricula were legitimate concerns that had a negative impact on the process of technology integration. The need for a professional development programme as a source of intervention became evident as a valuable solution. The findings of this study, therefore, suggested the need for the design and implementation of a professional development programme to address the shortcomings identified. The professional development programme could be custom made to address the specific needs of the participants to improve their competence in their implementation of technology integration. Section three provides additional details of the proposed instructor professional development plan and implementation strategies. The main focus of the professional development workshop was to improve the participants’ pedagogical competence as well as their ability to use technology tools and applications more effectively.

**Recommendations for the Implementation of the Professional Development Programme**

The professional development programme will take the form of a staff development workshop scheduled to last for five days. Before the beginning of the workshop, the participants will have the opportunity to email questions about the workshop to the facilitator. During the first session of the workshop, answers will be provided to any other questions raised by the participants sharing in the workshop. Throughout the workshop, the participants will have the opportunity to participate in hands-on activities that are designed to improve their competence in technology integration.

Day one will be reserved for the introduction of the workshop participants and the facilitator. The participants will be provided with the login credentials to the Moodle web resource that will be used to host all the resources for the workshop before the training. Afterwards, an orientation to the use of Moodle will be done targeting the use of and access to these resources. This will be followed by the introduction of the participants to the creation of a wiki, which they will use as a repository during the training.
On day two, a review of the design of the Wiki will be done at the beginning of the session. The main activity of the session will be the introduction of the participants to the designing of a Webquest and the creation of a blog using e-blogger. The Webquests will be created in small groups based on the choice of specific topics from the curricula. Each group will choose a practical topic, and each participant will be assigned specific tasks to complete the Webquest. Each participant will design his or her own blog and respond to the blog question on the Moodle page. At the end of the session, all participants will be required to post the Webquest and Blog into the specific area identified on the Moodle page.

Day three will begin with a review of the previous day’s lesson. This will be followed by the introduction of another web-based tool, Prezi, to the participants. The latter will be exposed to the operation of the interactive Smartboard. During the session, the participants will design individual Prezi presentations using topics from their curricula. Then, they will post their completed Prezi presentation on the wiki they created and on the designated space on the Moodle page.

On day four, the participants will begin the session by completing basic demonstrations on the Smartboard. The designing of technology-enriched lessons using topics from their curricula will follow this activity. The participants will be required to develop interactive lessons using PowerPoint to display different technology applications. The lessons will be developed in groups with each participant having the responsibility of designing at least one activity for the lesson. All these lessons will be posted on the Wiki and the Moodle page. The workshop will end on day five with the presentation of the interactive lessons designed by the participants. These presentations will be done on the Smartboard using the Wiki that was developed at the beginning of the workshop. An external evaluation team will be selected to evaluate the presentations. The evaluation team will give a brief report on the outcome of the presentations.

References


Francia, J. (2017). The effects of technology on student motivation and engagement in classroom-based learning. *All these and dissertations, 121*. http:duann.ene.edu/these/121


## Appendix

### Major Themes, Minor Themes, and Discrepant Cases

<table>
<thead>
<tr>
<th>Major Themes</th>
<th>Minor Themes</th>
<th>Discrepant Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact of technology integration on teaching</td>
<td>Technology integration improved academic performance</td>
<td>The utility of technology integration</td>
</tr>
<tr>
<td>Students’ abilities to integrate technology</td>
<td>Technology integration promoted interest and engagement</td>
<td>Supervision of technology integration</td>
</tr>
<tr>
<td>Tools and applications used by participants</td>
<td>Students’ were tech savvy but they also misused technology</td>
<td></td>
</tr>
<tr>
<td>Philosophy of participants</td>
<td>PowerPoint, videos and websites are the most common tools used by participants</td>
<td></td>
</tr>
<tr>
<td>Technology facilities and technical support</td>
<td>Philosophy determined how participants used technology</td>
<td></td>
</tr>
<tr>
<td>Methodologies used by participants</td>
<td>There is a shortage of specialized facilities</td>
<td></td>
</tr>
<tr>
<td>Training and preparation of participants</td>
<td>Technical support encouraged participants to technology integration</td>
<td></td>
</tr>
<tr>
<td>Challenges faced by instructors and students</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tools and applications used by students.</td>
<td>Participants used student-centered approaches</td>
<td></td>
</tr>
<tr>
<td>Participants’ perceptions of technology integration</td>
<td>Participants requested additional training in technology integration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor Internet connectivity, lack of resources and insufficient laboratory space were common challenges faced by participants</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Web applications, PowerPoint, and Smartphones were common tools used by students</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technology integration had its advantages and disadvantages</td>
<td></td>
</tr>
</tbody>
</table>
A Glimp at thier Raiting:
Target Inconsistencies found in the University of Technology, Jamaica Students’ Academic Writing Papers

SHALIEKA BURRIS
University of the Commonwealth Caribbean

TASHIEKA BURRIS-MELVILLE
University of Technology, Jamaica

Abstract

This study investigated target inconsistencies that are evident in the argumentative academic writing essay scripts of 30 students at the University of Technology, Jamaica. In Jamaica, studies have been conducted about the language challenges students encounter at the tertiary level when taking proficiency tests and when they enrol in remedial English courses; however, no study has documented the challenges students encounter beyond these situations. This study, therefore, identified the types and frequency of target inconsistencies found in students’ argumentative essay scripts and patterns of the target inconsistencies that were found. Target inconsistencies are deviations in the production of a target language by a learner (Rizzi, 2005). In this quantitative study, the data were collected from the 30 students’ argumentative scripts chosen using the stratified sampling technique. The types of target inconsistencies were identified using the description of the Error Analysis framework, which led to the determination of four types of inconsistencies-grammatical, lexical, discourse and mechanical. Additionally, frequency was determined by quantifying each target inconsistency once it occurred in different situations in the scripts; the results showed that the total number of inconsistencies quantified was 311. The patterns of inconsistencies are referred to as the observable sequence in which target inconsistencies were made. The results revealed that deviations were made in specific contexts which provided precise information on the areas of challenge for students so that they can be properly addressed at the tertiary level.

Keywords: target inconsistencies, grammatical, lexical, discourse, mechanical, error analysis, patterns of inconsistencies
Introduction

The language situation that exists in Jamaica is considered as a complex one. Two varieties exist – Standard Jamaican English and Jamaican Creole – and they are often used in specific contexts. According to Christie (2002), Jamaican Creole is considered an inferior language and is often used in the presence of family and friends. The inferior status was attributed to Creole because it was considered the speech of slaves (pp. 1–2). Standard Jamaican English, spoken by a smaller segment of the population, is considered superior as it was the language of the colonizers. Currently, the English-based Jamaican Creole functions on a continuum with its lexifier language Standard Jamaican English (Jetta, 2010). This means that there are no clear definable boundaries between Jamaican Standard English and Jamaican Creole. Jetta highlights that “the lexicon of Jamaican Creole is the most obvious factor leading to confusion about its separation from Standard Jamaican English” (p.2). Jetta also suggested that the complexity of the language situation and the range of varieties that a Jamaican Creole speaker must navigate can be very difficult, especially when learning Standard Jamaican English in school. It is against this background that we have explored the difficulties that tertiary level students have when producing Standard Jamaican English in their argumentative essays.

Statement of the Problem

The confusion among second language learners in Jamaica, partially caused by the involvement of Standard Jamaican English and Jamaican Creole, has affected not only the primary and secondary levels but also the tertiary levels in education. The Ministry of Education, Youth and Culture (2001) in its Language Policy identified that there is a concern for students who are not fully grasping the use of the English Language and this has been recognised for many years due to the unsatisfactory performance of 50% of candidates failing to achieve proficiency in English Language examinations at all levels. Of particular importance are tertiary level graduates who are said to leave the university without being proficient in writing or speaking Standard Jamaican English. Indeed, tertiary level students have been said to exhibit numerous language deficiencies as it is clear that they have limited exposure to Standard Jamaican English (Dyche, 1996; McLauren & Webber, 2009; Smith & Stewart-Mckoy, 2017). In light of these concerns, this study sought to investigate the kinds of target inconsistencies that were made, as well as to determine the patterns of target inconsistencies that are evident in tertiary level
students’ essay scripts. Educators need possible explanations for these patterns of inconsistencies in order to create suitable approaches to address these challenges.

**Purpose of the Study**

The aim of the study, therefore, is to identify the kinds and occurrences of target inconsistencies presented in students’ argumentative essay scripts to provide language educators with precise information when working with students who are predominantly second language learners of Standard Jamaican English. Additionally, we intend to provide information on the patterns of inconsistencies so that possible strategies can be implemented to curtail the production of target inconsistencies. Furthermore, language educators can utilize the findings to aid in developing teaching methodologies which reflect the areas that impede students’ proficiency in producing target consistent Standard Jamaican English language.

**Research Questions**

In an attempt to address the challenge Jamaican university students face in producing target consistent language, the following questions guided the study:

1. What are the types of target inconsistencies present in the argumentative essay papers of the participants?
2. How frequently do the target inconsistencies appear in the participants’ essays?
3. What are the patterns of target inconsistencies present in the participants’ argumentative essays?

**Rationale of the Study**

The current study is valuable for many reasons. Firstly, this study has implications for stakeholders at every level in the education system. The familiarity with English is crucial as it is an international language that facilitates many business-related activities often in the same areas students are studying. Identifying these inconsistencies is therefore imperative to the future success of graduates as deficiencies are mentioned in the media by journalists, specifically regarding graduates’ being unable to identify and appropriately use Standard Jamaican English and Jamaican Creole as well as function as university students (Smith & Stewart-Mckoy, 2017). Secondly, this study will provide language educators with
specific information about the kinds of inconsistent constructions that tertiary level learners exhibit in their academic writing papers and the areas in which the inconsistencies occur so that educators may consider how to address such inconsistencies. Thirdly, this study has filled gaps in the literature by identifying patterns of inconsistencies occurring in specific contexts in writing to provide information on the exact areas of writing difficulties for learners. There has not been any study which documents this information for tertiary level student writers.

Method

Given the objectives of the study, quantitative approach was utilised. A quantitative approach, as described by Creswell (2014), tests concepts by observing patterns among variables. These variables are quantified using numbered data and instruments so that patterns can be analysed. Essay scripts were examined producing numerical data on the types and frequencies of target inconsistencies found in order to arrive at the patterns of inconsistencies. The target population used for this study was a combination of first, second, third and final year students in various faculties across the university. A total number of 120 students in the faculties of science, engineering, education, business, and law sat the argumentative final essay test during the period 2015–2016 (Semester 2). The majority of the students are non-native speakers of English; that is, they are predominantly Jamaican Creole-speakers.

This sample was chosen conveniently because of the availability of scripts and the availability of participants who consented to be a part of the study. The participants, however, were chosen by using stratified sampling. According to McLeod (2014), stratified sampling is a sub-group of a sample population that will be representative of the target population. Specific types of essay scripts were identified in order for the sample to be representative. Scripts were pulled based on high scores, medium scores and low scores. Scripts used scored A, B, C, D, and U to account for target inconsistencies produced throughout all grade schemes and not only by those who failed. Scripts ranging in the A to B minus category, C minus to C plus category, D to U category were chosen to represent an equal illustration of target inconsistencies produced. We also identified essay scripts that were second marked by another instructor to ensure integrity, and reliability in scoring. Thirty scripts were pulled from the second sample of second marked scripts; each set contained 10 scripts representing the categories chosen (A to B, C minus to C, D to U). Thirty scripts were used in the study because of the limitation of examining scripts that were second marked by another instructor. However, the sample size
used (n = 30) allowed for realistic and consistent achievement of the results gathered from the data.

The course in which participants’ essays were analysed focuses on critical thinking, reading and writing assessments. The instrument used was the final assessment – an argumentative essay – to identify the target inconsistencies. The argumentative essay requires a coherent argument of 800–1000 words on a chosen topical issue. Lecturers use a process writing approach to assist students in achieving an effective final product. Students were given the opportunity to present a sentence outline – this is a plan containing a thesis statement, main points, counter-claim and refutation main points. Students were given feedback at least four times on their outline. After feedback was given, students were allowed to write drafts of different parts of the essay (introduction, body paragraph & counter-claim) to be reviewed by the lecturer as well as peers. These signed drafts were used in the writing of a final draft in a test. After the writing samples were selected, we chose to use data from whole sections of all the essay scripts pulled. This allowed us to have a wide variety of samples to use to illustrate the patterns of inconsistencies in the learners’ writing. The essay scripts were then pulled using the stratified sampling technique. A total number of 30 scripts was pulled. These scripts have a representative sample based on the grading scheme (A, B, C, D, & U).

Based on the ethics laws outlined by the university, consent had to be granted by the participants to take part in the study. All participants were contacted, and they gave consent. The identity of participants has been kept in strict confidentiality, hereby meeting the requirements of the university’s code of ethics. Data collected from essay scripts were used only for the purpose of this study.

Having selected whole sections of the essay scripts to analyse, we identified and described the target inconsistencies using the descriptions advocated by James (2013) in Error Analysis. After inconsistencies were identified, they were placed in categories provided by Error Analysis that best suited each inconsistency. Based on the categorisation of the inconsistencies found, the types of inconsistencies were identified. Frequency of target inconsistencies was determined by counting each kind of inconsistency in spite of repeat occurrences in some cases. For instance, if a learner spelt grammer for grammar two or more times in a script, it was counted as one spelling error. However, if three different words were spelt incorrectly, they were counted as three spelling errors. In the case of run-on sentences and comma splices, once the inconsistencies appear in different patterns, they were counted as two distinct run-on sentences or comma splices as advocated by James (2013).

1. A process approach is writing using steps such as: pre-writing, drafting, writing, revising and editing.
The patterns were subsequently analysed using the Statistical Package for the Social Sciences (SPSS). This programme provided visual representations of the types and frequencies of target inconsistencies and the observed patterns of inconsistencies.

**Limitations of the Study**

1. The sample size in the study was relatively small (30 scripts) so the data collected, and the findings gathered may not be able to be generalised in every situation.
2. The study does not differentiate between mistakes and target inconsistencies made.
3. While the essay scripts were randomly selected from a representative sample, there was no control over which scripts were chosen as selection was based on who consented to participate in the study. Therefore, this could have affected the number of males versus females who were participants in the study as well as the faculty from which these participants came.

**Results**

The findings revealed that the types of inconsistencies evident in the essay scripts are grammatical, lexical, mechanical, and discourse inconsistencies. The total number of target inconsistencies found in the essay scripts is 311. Of the types listed, grammatical inconsistencies accounted for 117 (40%) of all inconsistencies; lexical inconsistencies have a total number of 100 (34%). Mechanical inconsistencies have 67 (20%) and then discourse inconsistencies 27(6%). Figures 1 and 2 illustrate the types of target inconsistencies, the percentages, and the frequency of inconsistencies, respectively.

![Figure 1. Types of target inconsistencies and percentages.](image)
Grammatical Target Inconsistencies

Grammatical inconsistencies were included in this study based on the number of morphological and syntactical deviations made. James (2013) stated that grammar errors are usually discussed in terms of morphology and syntax. Morphology errors are related to word structure often occurring as a result of failure to conform with the target language. The word classes relating to morphological errors are noun morphology, verb morphology and verb tense formation errors and adverb morphology errors. Syntax errors, on the other hand, affect sentences and paragraphs rather than words. Some of the syntactic errors refer to comma splices/run-on sentences, noun agreement, fragment errors, omission or misuse of a noun or verb, and reference errors (p.154).

The results from this study found both morphology and syntax target inconsistencies which accounted for the majority of the inconsistencies throughout all the scripts. The area that was evident in the scripts from the morphological category as suggested by James (2013) was the verb morphology which manifested in inconsistencies in verb tense formation 10 (9%) and subject-verb agreement 20 (17%). The specific types of syntax inconsistencies found were run-on sentences/comma splices which accounted for most of the inconsistencies in the grammar category 45 (38%) and fragments 27 (23%). The final inconsistency found in the syntax category was noun agreement deviations 15 (13%). See Figure 3 for the overall types and percentages of the grammatical inconsistencies found in all essay scripts.
Frequency of Grammatical Target Inconsistencies

The total occurrence of grammatical inconsistencies found in all scripts was 117. The essay scripts ranging from A to B- have a total of 30 grammatical target inconsistencies (25%), scripts ranging from C- to C+ have a total of 55 inconsistencies (47%), and scripts from D to U have a total of 32 grammar deviations (27%). See Figure 4 and Table 1 for the general percentages of grammatical inconsistencies for each grade scheme and the total number of grammatical inconsistencies, respectively.

Figure 3. Types of grammatical inconsistencies and the percentages.

Figure 4. Percentages of grammatical target inconsistencies for each grade scheme
Patterns of Grammatical Inconsistencies

The patterns of grammatical inconsistencies observed in this study show regularity in each of the grammar deviations made by learners. Firstly, the data revealed that run-on sentences/comma splices were evident in all scripts and throughout all grade schemes. However, comma splices and run-on sentences appeared more in papers achieving C+ to C- and A to B- grades. See Table 2 for the frequency of the specific kinds of grammatical deviations made.

<table>
<thead>
<tr>
<th>Types of Grammar Deviations</th>
<th>A to B- Papers</th>
<th>C+ to C- Papers</th>
<th>D to U Papers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run-on sentence/ comma splice</td>
<td>14</td>
<td>23</td>
<td>8</td>
<td>45</td>
</tr>
<tr>
<td>Fragment</td>
<td>4</td>
<td>14</td>
<td>9</td>
<td>27</td>
</tr>
<tr>
<td>Subject-verb agreement</td>
<td>5</td>
<td>8</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Noun agreement</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Verb tense</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>

The examples from the essay scripts show that run-on sentences and comma splices are used in specific contexts.

a. “Eco-Tourism is nature-friendly what could go wrong? “(run-on sentence)
b. “Eco-Tourism is harmful; it disrupts the locals’ lives and negatively impacts the environment” (run-on sentence).
c. “Perhaps, this is why the agency is concerned with ensuring that all participating athletes are honest in their race; therefore, testing for stimulants is necessary to check for potential usage for unfair athletic performance enhancement” (run-on sentence).
d. This is an unreasonable request, however, the frequency and quantity in which these samples are needed vary (comma splice).

e. “Patients may worry about the welfare of their family who does not share the same religious beliefs, this results in a high level of stress” (comma splice).

What is evident from the examples given is that run-on sentences mainly occur when simple, shorter sentences are written as well as when the independent clauses are separated with causal conjunction- therefore and hence. Comma splices, on the other hand, occur when more compound sentences are written. The patterns from the scripts also show that these are the only cases in which run-on sentences and comma splices were made by the participants. These examples of the grammatical inconsistencies were evident in A to B- scripts and C+ to C- scripts. Some of the scripts ranging from D to U had only run-on sentences.

Secondly, fragments were evident throughout all grade schemes. While fragments appeared in D to U papers, they were mainly evident in the C+ to C- papers. The following examples give illustrations of this inconsistency.

f. “Which is a very unintelligent way of adopting religion” (fragment).

g. “Which is the record of all economic transactions between residents of a country and the rest of the world” (fragment).

h. “In concluding” (fragment).

i. “Despite evidence to the contrary, some of the beliefs that tourism brings about changes in our value system and behaviours and thereby threatens indigenous identity” (fragment).

Fragments appeared in two types of sentences in the essay scripts. The first type of sentence is a simple sentence which is missing the subject of the sentence, often beginning with ‘which’. The writer, in this case, applies a full stop right before using “which” still believing that the point is made clear. The second type of sentence in which fragments occur is a much longer sentence that appears to have all the components of a complete sentence but is lacking a complete idea. Therefore, the subject and verb of the sentence is quite clear but the understanding of the point being made is missing.

Thirdly, subject-verb agreement inconsistencies were found mainly in C+ to C- papers, but they also appeared in A to B- and D to U papers. The following instances appeared throughout all the grade schemes.

a. “These activities HAS overtime helped to destroy coral reefs” (have).

b. “Several countries IS making efforts to utilize renewable energy sources” (are).

c. “Local industries HAS the potential to create a plethora of job opportunities” (have).
d. “Critics may argue that eco-tourism GENERATE a lot of cash, keeping the economy flowing and providing jobs” (generates).

The deviations for subject-verb agreement show that the verb in each sentence does not agree in number with the subject or noun in the sentence. The verbs that are lacking the singularity and plurality are close to the noun in each of the sentences given.

In addition, noun agreement inconsistencies were exhibited in the essay scripts. The following examples illustrate the inconsistencies found in the essay scripts.

a. “Therefore, if TOURIST continue to destroy the dwellings of marine animals . . .” (tourists).

b. “We have heard many CONTROVERSY . . .” (controversies).

c. “Within the various religious beliefs, there are many DENOMINATION that vary” (denominations).

The noun agreement inconsistencies occur in two situations in these examples. In a the noun lacking a plural marker precedes the verb. The other examples b and c occur in situations where the pronoun plural marker-many comes before the nouns that require plurality.

Finally, verb tense inconsistencies accounted for the least grammatical inconsistencies. These inconsistencies appeared mainly in C+ to C- scripts. The following examples demonstrate the specific kinds of verb tense inconsistencies.

d. “In conclusion, tourism is a very powerful agent in our life, even though we might not MANAGED to secure some form of unemployment . . .” (have managed).

e. “Tourism has HELP to move the world from a pre-industrial stage to a post-industrial one” (helped).

f. “Tourism has CREATE many dangers to the environment” (created).

The examples above show that verb tense deviations are made in situations where an auxiliary verb is required with a main verb. This example is seen in d. The other two examples show that the verb form ed was lacking from sentences that required a past form of the verbs help and create.

**Lexical Target Inconsistencies**

Lexical inconsistencies were also included in the classification of errors by the Error Analysis Framework. James (2013) referred to lexical errors as deviations from the
vocabulary of a target language. Richards (1976, as cited in James, 2013) suggested that there are seven (7) things to know about a word: (1) its morphology which encompasses the knowledge of a word’s spelling and pronunciation, (2) the syntactic behaviour, (3) its semantic value, (4) secondary meanings, (5) how the word is used, (6) other words associated with a word, (7) and functional or situational restrictions. These seven items are categorised as formal errors and semantic errors (p. 144).

Types and Frequency of Lexical Inconsistencies

The total number of lexical inconsistencies found in this study was 100. The kinds of lexical deviations include spelling which had a total of 81 (81%) and expression deviations which accounted for 19 (19%). Scripts ranging from A to B- accounted for 20 (20%) lexical inconsistencies, C+ to C- scripts have 30 lexical errors (30%) and D to U scripts have 50 inconsistencies (50%). See Figures 5 and 6, and Table 3 for types and percentages of lexical deviations and percentages for each grade scheme.

Figure 5. Types of Lexical Inconsistencies and the Percentages

Figure 6. Percentages of Lexical Target Inconsistences evident for each Grading Scheme
Patterns of Lexical Inconsistencies

The majority of the lexical inconsistencies evident among the essay scripts were spelling, which accounted for 81% of lexical inconsistencies, and expression deviations account for 19%. Scripts between D to U exhibited most of the spelling and expression inconsistencies and then C- to C+ scripts. Only a few spelling and expression inconsistencies appeared in A to B- scripts. See Table 4 for the number of spelling inconsistencies made for each grade scheme.

The following examples show some of the most frequent spelling inconsistencies.


The patterns observed for spelling deviations include omissions, over-inclusions and misordering of words in the target language. From the examples, glimps, exchang, helth, and accommodate all have a letter omitted from each word. Some words have included too many letters, for example arise, habbitat, useing, develope, argueing, priviliage, and enevironment. The misordering of words include continetns, and thier. Finally, misselections of words include inconsistencies such as speech,
response, and competitive. These examples mainly occurred in D to U essay scripts.

Additionally, expression inconsistencies accounted for less of the lexical inconsistencies. The term expression was used in this study based on James’ (2013) explanation of stylistic errors. Stylistic inconsistency is a relatively broad concept which includes the incorrect register, clumsy sentences, and incorrect word order of the intended target language. Evidence of expression inconsistency is shown in all scripts, but it is more evident in D to U scripts. The examples of expression inconsistency taken from C+ to C scripts and D to U scripts are listed below.

c. Despite evidence to the contrary, OF coal becoming our main energy source in Jamaica, some argue that the use of coal to fuel.” (if coal becomes the main energy source…).

d. “Although there HAVE been evidence on the matter OF COAL BURNING COULD BE HARMFUL there are measures that can be put in place to minimize ARE eliminate the effects of the burning of coal in the bauxite industry in Jamaica”. (has, of the harmful effects of coal burning, or).

e. “FOR WHILE, tourism has done a lot of good, it has done a lot of harm” (while tourism has done a lot of good, it has done a lot of harm).

Unlike other inconsistencies mentioned, expression inconsistencies do not have a specific pattern for most of the instances in which they were made. However, it is evident in many examples that the use of have does not conform to the correct register of the target language. Also, in sentences where of was used followed by other words, there tended to be a clumsy way of expressing those words.

**Mechanical Target Inconsistencies**

Mechanical inconsistencies were also included as a category in this study. James (2013) referred to mechanical errors as a type of substance error which is broken into four kinds: punctuation errors, typographic errors, dyslexic errors and, confusibles. Punctuation errors include the misuse of exclamation marks, underuse of apostrophe, under and overuse of capitals, over inclusion or omission of a comma. In addition, typographic errors usually occur when information is typed, and people who are usually good spellers might make errors due to them being poor typists. Another example of mechanical inconsistencies is dyslexic errors which refer to a misselection from two letters that represent the same sound. Finally, confusibles are lexical errors which confuse morphemes and words when the sound is similar (p.133).
Types and Frequency of Mechanical Inconsistencies

The data revealed that punctuation was the only type of mechanical inconsistencies occurring in the essay scripts. The types of punctuation inconsistencies include omission and overuse of capitals, omission of commas and underuse of apostrophes. The omission or overuse of capitalizations recorded 35 (52%) instances, omission of commas recorded 22 (33%) instances, and under use of apostrophes recorded 10 (15%) instances. Figures 7 and 8 show the percentages and raw scores, respectively.

Figure 7. Types of Mechanical Target Inconsistencies and Percentages

Figure 8. Percentages for Mechanical Target Inconsistencies for each Grading Scheme Category
Frequency of Mechanical Inconsistencies

Scripts ranging from A to B – accounted for 19 (28%) mechanical inconsistencies, C+ to C- scripts have 21 (31%) mechanical inconsistencies, and D to U scripts have 27 (41%) inconsistencies. Table 5 illustrate percentages and raw scores of inconsistencies.

Table 5: General Frequency of Mechanical Inconsistencies

<table>
<thead>
<tr>
<th></th>
<th>A to B- Papers</th>
<th>C+ to C- Papers</th>
<th>D to U Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19</td>
<td>21</td>
<td>27</td>
</tr>
</tbody>
</table>

Patterns of Mechanical Inconsistencies

Omission and overuse of capitals, omission of commas, and omission of apostrophes were almost equally evident in all scripts. See Table 6 for the specific frequency of punctuation inconsistencies for each grade scheme.

Table 6: Frequency for the Types of Mechanical Inconsistencies for each Grading Scheme

<table>
<thead>
<tr>
<th>Types of Mechanical Deviations</th>
<th>A to B- Papers</th>
<th>C+ to C- Papers</th>
<th>D to U Papers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omission and overuse of capitals</td>
<td>9</td>
<td>12</td>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td>Omission of commas</td>
<td>6</td>
<td>7</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>Underuse of apostrophes</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>10</td>
</tr>
</tbody>
</table>

The following examples illustrate the specific kinds of mechanical inconsistencies that were evident in the essay scripts belonging to A to B-, C+ to C- and D to U scripts.

b. “If the Government allows coal to be a source of energy, it will have negative effects” (overuse of capital – government).
c. “In conclusion, Tourism is a very powerful agent in our lives” (overuse of capital – tourism).
d. “Hence discussion of opposing opinions arises as to whether using coal to fuel...” (omission of comma after hence).

e. “Recently a research was carried out foreign exchange” (omission of comma after recently).

f. “However others do believe that tourism has not done more harm than good in our world” (omission of comma after however).

g. “Lets put it this way” (Omission of apostrophe – let’s).

h. “Its a driven force for economic benefits” (omission of apostrophe – it’s).

i. “The Jamaica industry will benefit if coal is used as a fuel” (omission of apostrophe – Jamaica’s).

The omission and overuse of capitals occur in situations that have a proper noun and do not have a proper noun, respectively. The omission of commas is evident in sentences that begin with an adverbial phrase. The comma is missing after the adverbial phrases. The underuse of apostrophes occurs in two instances. The first instance in which it is not used is to mark the omission of a letter in contractions such as let’s and it’s. The second instance in which it is not used is to mark the possessive case of nouns as in Jamaica’s industry.

**Discourse Target Inconsistencies**

Discourse inconsistency is the final category of deviations found in this study. Discourse errors, as described by James (2013), are related to process and text as well as meaning versus interpretation. Discourse errors are broken into three parts: topical coherence, relational coherence, and sequential coherence. Topical coherence error relates to the sections of the essay that are not relevant to the given topic while relational coherence error refers to parts of the essay (internal sentences) that are unrelated to each other, which affect how the information is understood. If sentences do not relate to each other, then according to James (2013), they lose coherency. Sequential coherence refers to the need for statements to be arranged in a specific order for them to be effectively understood.

**Types and Frequency of Discourse Target Inconsistencies**

Topical coherence, relational coherence, and sequential coherence inconsistencies were all evident among the scripts. Sequential incoherence accounted for 11 (41%), topical coherence accounted for 10 (37%) inconsistencies, and relational coherence has a total of 6 (22%) inconsistencies as shown in Figures 9 and 10, and Table 7.
Patterns of Discourse Inconsistencies

Discourse inconsistencies were the least of all the categories of inconsistencies to appear in the essay scripts. The data revealed that more than half (60%) of the scripts had no discourse inconsistencies. Among the other 40%, sequential incoherency accounted for most of the inconsistencies in the discourse category.
These inconsistencies are mostly evident in D to U scripts. Topical incoherence was only seen in C+ to C- and D to U essay scripts. On the other hand, relational incoherency appeared in a few scripts from each category of the grading scheme. The following example displays sequential incoherency in the essay question, “Religion has done more harm than good in our world. Agree or Disagree”.

a. “Even though the man may loyal and faithful and they both love each other the religion stands against it. Which is really ridiculous as, then this woman might then, be forced to marry someone she does not love”.

The statement ‘the women might then be forced to marry someone she does not love’ is situated in the wrong place. The participant needed to explain in which religion women are forced to marry partners they do not love or know and then provide other information about why this may not be done in individuals’ favour.

One of the essay questions that the participants were asked to write on was “Testing for the use of performance enhancing substances in sports is equitable. Agree or disagree”. The following example demonstrates topical incoherency.

b. “Testing for the use of performance enhancing substances will enlighten athletes on the penalties they will face if these substances are found within their systems. Harris and Atkinson (2013) stated that sanctions for positive drug tests range in severity from public warnings to multi-year suspensions from participating in competitions. Athletes results, record or standing in competitions may be cancelled or voided if they are tested positive for performance enhancing substances (Brown, 2015)”.

The argument stated here is not related to the specific question asked. The participant was expected to argue about the equity of testing, but the focus was placed on the merits of testing in this paragraph.

Relational incoherency was evident in the question “Tourism has done more harm than good in our world. Agree or Disagree”. The following example demonstrates relational incoherency.

c. “Tourism is a double edge sword for which the world sharpens on a daily basis. Progress is a choice. Job creation is a choice. Whether we give our children a future of more or a future of less, this too is a choice. The tourism industry is more labour intensive than other sectors of the world as revenue produce is greater and more rewarding”.

The incoherency in this instance is due to the lack of connection between the sentences. It is not clear what exactly is being discussed, and sentences do not seem
to relate to each other, except for the second, third and penultimate sentences which seem to have a common theme about ‘choice’. Albeit, readers would still struggle to understand the discussion.

**Discussion**

The results from this study found four major types of target inconsistencies among the participants' essays, namely grammatical, lexical, mechanical, and discourse inconsistencies. The grammatical inconsistencies found are comma splices/run-on sentences, verb tense, subject verb agreement, noun agreement and fragments. Lexical inconsistencies were based on spelling and expression. Mechanical inconsistencies are omission and overuse of capitals, omission and over inclusion of commas and underuse of apostrophes. Sequential, topical, and relational discourse incoherencies were also found. A total number of 311 inconsistencies were made. Regardless of gender, faculty, grade, and age, participants have writing challenges that need to be addressed.

The results of this study concur with previous results mentioned in the literature review (Dyche, 1996, 2009; Pollard, 1999; Smith & Stewart-Mckoy, 2017). These studies have also found grammar, mechanics, discourse, and lexical inconsistencies to be challenges for Jamaican tertiary students. The previous studies also found that grammatical and lexical inconsistencies were the most frequent deviations to occur. Discourse inconsistencies have been least popular among the other inconsistencies listed but have been noted as a concern for McLaren and Webber (2009). The findings of this study are most consistent with Smith and Stewart-Mckoy's (2017) study even though they conducted a much larger study. It was revealed in their study that grammatical and lexical inconsistencies occurred most frequently. Likewise, this study has recorded similar results. However, Smith and Stewart-Mckoy (2017) observed inconsistencies such as collocation, confusion of sense relations, malapropism, and redundancy which were not present in this study. James (2013) found that lexical inconsistencies were the most frequent to occur among second language learners, but this study proved otherwise.

The study of language deficiencies and weak performance in English examinations is not new, and there are still concerns regarding inconsistencies that appear in students' writing. The number of inconsistencies (311), which appeared in the essay scripts for this study surely proves that second language learners have many difficulties with producing target consistent language. While this number may seem small to some, it is considered alarming for the future success of students at the tertiary level. The types and number of target inconsistencies made suggest
that more needs to be done to integrate approaches to assist learners to overcome frequent target inconsistent challenges. Therefore, the challenge for good academic writing lies with educators understanding and paying close attention to what is produced by students and how it is produced.

A major contribution of the present research is that it provides needed information on the types of inconsistencies that are produced and the specific patterns in which they are produced by students in the English mediated course (Argumentative Writing). The information given is critical since other studies have focused on difficulties with proficiency tests and English remedial courses. Despite the small sample size used the findings suggest that the deviations have an obvious pattern which will be useful for educators. These inconsistencies prove to be a challenge among learners. Therefore, language teachers need to be mindful of these areas and highlight interference and transfer of the students’ mother tongue in their production of the target language (English) as well as when there are obvious lapses in the target language. It is only by being cognizant of the patterns that appropriate guidance can be provided to students.

This study also raises an additional opportunity for future research to examine inconsistencies or difficulties faced by other students who are taking another English mediated course with a focus on exposition. This course is taken before the argumentative writing course. This will allow for findings to be compared and to identify whether the inconsistencies are similar or different or if there might be additional inconsistencies not found by the present study involving argumentative essays.

**Conclusion**

This study has given an account of the main target inconsistencies made by a group of second language learners at the university level in their argumentative essay scripts. It can be concluded that the participants made 13 types of target inconsistencies and a total number of 311 inconsistencies namely run-on sentences/comma splice, verb tense, noun agreement, subject-verb agreement, spelling, issues with expression, sequential incoherency, topical incoherency, relational incoherency, misuse of capitalization, misuse and underuse of apostrophe and misuse of commas. Therefore, the challenge for good academic writing rests on the understanding that learners must be provided with adequate feedback on their writing in order to limit the high frequency of target inconsistencies particularly in the specific examples shown. Also, the types of inconsistencies and the patterns found will allow policy-makers, university stakeholders, and university
lecturers to find urgent methods to appropriately aid students with the difficult areas they are facing.

**Recommendations**

1. We, therefore, recommend that the university stakeholders and lecturers understand that for teaching and learning objectives to be met educators cannot assume that students who leave the secondary level and transition to the tertiary level have already achieved a high level of competence in English.
2. Second language learners have passed the stage where fluency in a second language will be close to native-like competence, so it is imperative that writing courses are designed in a way that the feedback provided for learners will effectively address the writing challenges they have.
3. Additionally, the entire academic community must work together to find suitable approaches/solutions to address and help students with the immediate difficulties related to English.

**References**


The Effects of Teacher Competencies, Gender, and School Location on Primary School Standardised Academic Test Results in Three Districts in Jamaica

MELVA ARMSTRONG
University of Technology, Jamaica

Abstract

The purpose of the study is to assess how the relevance of the academic training received by educators and the number of years of teaching experience are related to the educational development of students. It will also determine if gender and school location predict the academic achievement of students. The sample of 623 students from 43 schools came from secondary data provided by the Government Agency responsible for education. The variables were evaluated, applying both a cross-sectional and longitudinal research analysis which examined the test results of two national tests. The quantitative analysis tool used was a logistical regression. Cross-sectional and longitudinal studies which reviewed teachers’ specialised training in education were not significant for the Grade Three Tests but were significant for the Grade Four Tests. Teachers’ years of experience was not significant for the Grade Three Tests and was significant for Grade Four Tests; however, the initial years were more effective with effectiveness diminishing over time. Results for both cross-sectional and longitudinal analyses showed that gender was consistently a statistically significant predictor for the standardised academic test scores for students. The analysis of the variable which captured location data could not be used based on data limitations. The study results can contribute to academic and policy decision making processes.

Keywords: competencies, gender, location, student achievement

Introduction

Competencies are knowledge and skills supporting technical and functional expertise required to perform a work activity. Private and public sector employers...
have assessed these as necessary tools for the achievement of results. But, do the presence and utilisation of competencies impact results? The focus is the effectiveness of the level and relevance of academic training received by educators on the educational development of students in the primary school system. The research will also assess the effects of gender and school location on the academic achievement of the students.

Results from the body of research have indicated that teacher effectiveness is a strong predictor of student achievement (Aaronson, Barrow, & Sander, 2007; Darling-Hammond, 2000; Muñoz & Chang, 2007; Sanders & Rivers, 1996; Stronge, Ward, Tucker, & Hindman, 2007). Other researchers have found that years of experience is a predictor of student achievement (Huang & Moon, 2009; King Rice, 2010). Although student gender has a predictive effect on the academic performance of students, the results are different depending on the country of (Dayioglu & T urlut-A shik, 2007; Evans, 1999; Machin & McNally, 2005) Meanwhile, the impact of school location, urban versus rural, on academic performance of students, differed based on country (De Lisle, Seecharan, & Ayodike, 2010; Valdes et al., 2008; Yusuf & Adigun, 2010).

Research Questions

The research seeks to answer the following questions:

1. Is the relevance of the academic training received by primary level educators and the number of years of experience teaching associated with the academic development of students in primary schools?

2. Do student gender and school location predict the academic achievement of students in primary schools?

Research Hypotheses

H<sub>1</sub>: The standardised academic test scores of children in primary institutions will increase if they are taught by teachers who have specialised training in education (i.e., Teacher Certificate/Diploma or B.Ed. vs B.Sc./B.A.).

H<sub>2</sub>: The standardised academic test scores of children in primary level educational institutions will increase if they are taught by teachers with more years of experience when compared to teachers with less experience.

H<sub>3</sub>: The standardised academic test scores of female students in primary level educational institutions will be greater than that of male students.
$H_4$: Students attending urban schools will score higher on standardised tests of academic achievement than children attending rural schools.

**Significance of the Study**

The overall objective for the research is to provide information which could guide policy decisions in the selection and retention of the teachers for primary education, and strategies for gender and location. One possible long-term effect of the research is the improvement in human capital which could positively impact the socioeconomic status of individuals and overall development.

**Definitions**

Student results are defined as the test scores, which is the output indicator for the standardised tests (Falch & Naper, 2013). In finding a definition for the term teacher “effectiveness” scholars noted that the multiple issues relating to the complexity of teaching tasks and the contexts in which teachers work have contributed to the challenges (Stronge, Ward, & Grant, 2011). Others argued that most observers characterised teacher quality using two broad elements, namely, (1) teacher preparation and qualification, and (2) teaching practices (Lewis et al., 1999). For this paper, teacher quality/effectiveness will focus on qualification in education and experience in teaching.

**Review of Literature**

**Teachers’ Qualification and Students’ Achievement**

The assessment of teachers’ qualification and students’ achievement can be reviewed from both a cross-sectional and longitudinal perspective. Students assigned to several ineffective teachers in a row have different levels of progress compared to those assigned to several highly effective teachers in sequence (Sanders & Rivers, 1996). Contradicting these findings, other scholars were uncertain whether an accumulation of positive or negative teacher effects over time leads to differences that generate any real academic advantage (Bressoux & Bianco, 2004). Other intellectuals moved beyond the issues of preparation and qualifications for teaching to ones of teacher competence and effectiveness and concluded that there was a link between teacher effectiveness and student learning (Stronge, Ward, Tucker, & Hindman, 2007).
One study confirmed that both the previous and immediate teachers produced observable and consistent effects on student outcomes (Heck, 2009). In contrast, another research concluded that education, years of experience and race have little impact on student achievement (Muñoz & Chang, 2007). In the examination of the effectiveness of academic qualifications on student results for early childhood institutions, the findings concluded no significant relationship between teacher qualifications and student achievement (Early et al., 2007).

**Teachers’ Years of Experience and Student Achievement**

Researchers assessed the effect of teachers’ years of experience on student outcomes with varying results (Chingos & Peterson, 2011; Huang & Moon, 2009; Kane, Rockoff, & Staiger, 2008). One group of researchers found that type of experience not just years of experience was essential and that teachers were more effective in the initial years with this effectiveness decreasing over the years (Huang & Moon, 2009).

Further analysis showed that teacher effectiveness steadily improved until the 21st year with declines recorded beyond that (Huang & Moon, 2009). Results from another study raised the question of negative returns to experience over time but did not carry out further analysis to clarify (Chingos & Peterson, 2011). Teachers showed the most significant productivity gains during the first few years with a decline in performance in the years following (King Rice, 2010). Teachers with five years’ experience showed a similar impact on student achievement as those with 20 years (King Rice, 2010).

While the classroom level teaching experience was a valuable predictor of student learning the generalisation of this finding was limited (Muñoz, Prather, & Stronge, 2011). Conversely, others found that years of experience had little effect on the reading achievement of high school students (Muñoz & Chang, 2007). Despite this finding, the conclusion that while years of experience is a valuable control variable, it was challenging to interpret the myriad of relationships emerging from years of experience and student achievement (Wayne & Youngs, 2003).

**Student Gender and Student Achievement**

Results by gender can be examined based on location and evaluation methods (Cornwell, Mustard, & Van Parys, 2013; Dayioğlu & Türüt-Aşik, 2007; Falch & Naper, 2013) Disparities in gender and results can be assessed on a country basis, for instance in Turkey educational attainment of women lags behind men.
(Dayioğlu & Türüt-Aşik, 2007), in West Africa, South Asia and the Middle East extreme gender disparities in education against women still exit (Stromquist, 1990).

In the Commonwealth Caribbean, there are shifts in educational outcomes for both boys and girls with girls showing a significant improvement over boys (Plummer, 2007). Scholars showed that with the exception of the Dominica Republic and Cuba girls outperformed boys in third grade and sixth-grade mathematics (Valdés et al., 2008). This result was reversed for the other countries as boys’ scores exceeded girls in mathematics, but the converse was true for reading (Valdés et al., 2008). The current gender situation in Jamaica is one in favour of girls (Evans, 1999; Figueroa, 2007). Historically, in Jamaica, the boys outperformed the girls at all levels as evidenced from the 70:30 ratio which existed for the student admissions at the University of the West Indies Mona campus in 1948 (Figueroa, 2007). In explaining the areas which influenced the shift, Figueroa (2007) posited that it was mainly due to gender socialisation in-home and community; how boys and girls experienced the educational system; and the differential paper qualifications demand from men and women as required by employers.

Scholars who examined student results based on the type of evaluation noted that there were differences between objective (test scores) and subjective (teacher assessments) (Cornwell et al., 2013; Falch & Naper, 2013). The results of both studies found that while objective test scores tended to vary by subject and gender, subjective test scores favoured females more than males (Cornwell et al., 2013; Falch & Naper, 2013). In analysing the objective test scores, the suggestion was that the difference for males was affected by their lower level of non-cognitive development when compared to females (Cornwell et al., 2013). To address this issue, the researchers recommended the use of alternative teaching methods which would focus on the level of the males’ non-cognitive development (Cornwell et al., 2013).

School Location and Student Achievement

School location is another dimension affecting the results of the academic achievement of students (De Lisle et al., 2010; Eraikhuemen, 2003; McCracken & Barcinas, 1991; Valdés et al., 2008; Yusuf & Adigun, 2010). A Nigerian study found a significant difference between rural and urban schools where urban students outperformed their rural counterparts (Eraikhuemen, 2003). Conversely, another study in Nigeria found that school location had no significant impact on student performance (Yusuf & Adigun, 2010).
Method

Research Design

The ex post facto research was used because the data sets were from past primary students’ test performance in three school districts in Jamaica. The study was conceptualised to examine both the cross-sectional and longitudinal effects of academic qualifications and years of experience of teachers in the primary school system, on students’ achievement in three school districts.

Data Collection

Two national assessment instruments were used to evaluate the students’ performance. The governmental agency responsible for education provided two data files, one with student records for both tests and the other with selected teacher information. To link teachers with student data, the researcher used the unique school identification number, which was a variable in both files. To overcome the uncertainty associated with matching teacher with students, the selection principle included schools with only one teacher in Grade Three and another teacher in Grade Four. The assessment included two schools where a single teacher taught both grades. The sample excluded students with data for only the Grade Three, or Grade Four test results. At the end of the data cleaning activity, the file contained 623 students from 43 schools in the selected school districts. Each student record consisted of the results for the Grades Three and Four tests in addition to teacher information for both grades.

The sample contained the same number of girls and boys. Most of the students attended schools in District three. Due to the constraints of linking student and teacher data, the resultant sample was not representative of the school location variable. Most of the students in the sample attended primary schools. Less than 10% of the students mastered the Grade Three Diagnostic Test, while approximately 67% mastered the Grade Four Literacy Test. More teachers with one to 10 years of experience instructed Grade Four students, 43%, as compared to approximately 36% for Grade Three teachers with the same band of years of service.

Data Analyses

In the design of the three logistic regression models, two assessments used the cross-sectional methodology, and one used the longitudinal evaluation over the two years.
Based on the review of the literature, the logistic regression models for the two cross-sectional years used the hierarchical entry method with the dependent variable being overall mastery in grades three and four, respectively. The independent variables were entered in three blocks to assess their predictive capabilities on the model. The three blocks contained student characteristics, teacher training and teaching experience.

Similarly, for the longitudinal assessment, a hierarchical method was used for the model with the dependent variable being the overall mastery for grade four. Six blocks were used to enter the independent variables in the model. The first block had the student overall mastery score for the Grade Three Diagnostic Test; the second block contained the gender of the student and the location of the school. The third block had the variable, which recorded if the Grade Three teachers received training in education. The fourth block had the three dummy coded variables for years of experience for the Grade Three teachers. The fifth and sixth blocks contained teacher training in education and years of experience for the Grade Four teachers, respectively.

Logistic regression was chosen for this study because the dependent variable was categorical (Sekaran & Bougie, 2016). Additionally, the use of logistic regression meant that, while the need for strict assumptions was eliminated, the results were similar to regression analysis (Sekaran & Bougie, 2016).

**Limitations of the Study**

The use of secondary data restricted the analysis because additional information could not be measured (Darling-Hammond, 2000). Another limitation is the use of the single standardised test score for the analyses. Sanders (2000) suggested that the presentation of simple test averages by schools is the worst use of data for reporting. The controlling for socio-economic factors and the use of prior student achievement results were solutions offered to address the issue of the single average (Sanders, 2000). In the current study, information on the socio-economic factors of the students was not available. However, the study included prior student results in the analysis. In preparing the data for analysis, the removal of students not having test results in both years would have contributed to a truncated sample of the student population, which could result in an overestimation of student achievement (Sanders, 2000).
Results

The analysis of the four hypotheses, namely: teachers’ specialised training, teachers’ years of experience, student gender and school location were assessed based on the results from the logistic regression models. Multicollinearity among the independent variables was undetected as the standard errors for the B coefficient were all less than 2.0, and the correlation coefficient between the independent variables were less than 0.5.

Cross-Sectional Analysis – Grade Three Data

The first cross-sectional logistic regression analysis assessed the mastery of the Grade Three Diagnostic Test with students’ gender and school location, teachers’ training in education, and teachers’ years of service, as predictors. Of the three blocks of independent variables entered, only the block containing student gender and school location was statistically significant. However, a test of the full model was statistically significant, indicating the set of predictors differentiated students who achieved mastery on the examination and those who did not ($\chi^2(6, 623) = 14.99, p < 0.05$).

Results for the pseudo $R^2$ specifically, Nagelkerke’s $R^2$ was 0.05, which indicated a very weak relationship between prediction and grouping. The Wald criterion demonstrated that only student gender made a significant contribution to prediction ($p = 0.02$). The odds ratio for this variable indicated that female students were 1.92 times more likely to attain mastery on the Grade Three Diagnostic Test when compared to males. The Hosmer and Lemeshow test suggested a good fit between predicted and observed probabilities in classifying the Grade Three Test results ($\chi^2(7, 623) = 4.85, p = 0.68$).

Cross-Sectional Analyses

The second cross-sectional logistic regression analysis assessed the mastery of Grade Four Literacy Test with gender and school location, teachers’ training in education, and teachers’ years of service, students as predictors. A test of the full model was statistically significant indicating that the set of predictors reliably differentiated students who achieved mastery on the examination and those who did not ($\chi^2(6, 623) = 62.08, p < 0.00$). The pseudo $R^2$ specifically, Nagelkerke’s $R^2$ was 0.13, which indicated a weak relationship between prediction and grouping.
The Wald statistic showed that four of the six predictor variables made a statistically significant contribution to the prediction of Grade Four mastery results. These were gender of student \((p < 0.00)\), school location \((p < 0.05)\) teachers’ training in education \((p < 0.05)\), and teachers’ experience 31 to 45 years \((p < 0.00)\). The results indicated that a female student was 2.5 times more likely to attain mastery when compared to their male counterpart. Students who attended rural schools were 1.79 times more likely to attain mastery than their counterpart attending urban schools. Students taught by a teacher with qualifications in education were 1.8 times more likely to attain mastery when compared with students taught by a teacher without these qualifications. Students taught by teachers with one to 10 years of experience were 3.13 times more likely to attain mastery when compared to students taught by teachers with 31 to 45 years of experience. Hosmer and Lemeshow test suggested a good fit between predicted and observed probabilities in classifying the Grade Four test results \((\chi^2 (7, 623) = 2.59, p = 0.92)\).

**Longitudinal Analyses**

The longitudinal logistic regressions were conducted to predict mastery of Grade Four Literacy with Mastery of Grade Three Diagnostic Test, teachers’ training in education for both grades, teachers’ years of service for both grades, students’ gender and school location as predictors. Of the six blocks of independent variables entered only the blocks containing the teachers’ training in education and teachers’ years of experience for Grade Three were not statistically significant. The full model was statistically significant indicating that the set of predictors reliably differentiated students who achieved mastery on the examination and those who did not \((\chi^2 (11, 623) = 92.97, p < 0.000)\). Nagelkerke’s pseudo \(R^2\) was 0.19, which indicated a weak relationship between prediction and grouping.

The results from the Wald statistic showed that four of the eleven predictor variables made a statistically significant contribution to the prediction of Grade Four mastery. These were mastery in Grade Three Diagnostics test \((p < 0.00)\), gender of student \((p < 0.00)\), school location \((p < 0.05)\), Grade Four teachers’ training in education \((p < 0.05)\), and Grade Four teachers with 31 to 45 years of experience \((p < 0.00)\). Given that the block which tested Grade Three teachers’ years of experience was not statistically significant results from this block will not be analysed in the discussions. The results indicated that students who attained mastery in the Grade Three Diagnostics test were 10.20 times more likely to attain mastery in the Grade Four Literacy Test. Female students were 2.38 times more
likely to attain mastery in the Grade Four test in comparison to their male counterparts. Students who attended rural schools were 1.78 times more likely to attain mastery than their counterpart attending urban schools. Grade Four students taught by teachers trained in education were 2.16 times more likely to attain mastery in the Grade Four test than their counterparts taught by teachers not trained in education. While the block containing the clustered variable for Grade Four teachers’ years of experience was significant, only the last cluster item was a statistically significant predictor. This result indicated that Grade Four students taught by teachers with 1 to 10 years’ experience were 3.23 times more likely to attain mastery when compared to students taught by teachers with 31 to 45 years of experience. Hosmer and Lemeshow test suggested a good fit between predicted and observed probabilities in classifying the Grade Four test results ($\chi^2 (7, 623) = 7.18, p = 0.41$).

Summary of Findings

The cross-sectional and longitudinal results were inconsistent in the predictive capabilities of the independent variables, teachers training in education, teachers’ years of experience, and school location. Students’ gender was the only independent variable consistently associated with students’ academic performance for both cross-sectional and longitudinal analyses. Previous year test results, used in the longitudinal assessment, predicted current year students’ academic achievement.

Discussion

Teachers’ Specialised Training in Education

The cross-sectional assessment using Grade Four data showed that teachers who have specialised training in education produced significant gains in students’ achievement. The results for the Grade Three Diagnostic Test was dissimilar. This pattern of both significant (Goldhaber & Anthony, 2007; Muñoz et al., 2011) and non-significant associations were also found by other researchers (Chingos & Peterson, 2011; Muñoz & Chang, 2007). These inconclusive results within the same study were similar to the findings by Early et al. (2007), where the researchers suggested that the teacher preparation system, support within programmes and market forces were possible causes for lack of association. In the case of the current studies, these explanations were not plausible because both Grades Three and Four teachers used the same preparation system and programme supports, but Grade
Four teachers showed an association with student achievement and Grade Three did not. Possible explanations for the differences could be the data, the Grade Three Test design and teacher assignment.

The differences in the findings of the two cross-sectional analyses may have been attributed to the percentage of students mastering the two tests, nine percent and 67% for the grades three and four tests, respectively. Given that less than 10% of the students mastered the Grade Three Diagnostic Test, the significantly skewed data favoured non-mastery could have contributed to the non-significant association of teachers’ specialised training in education to student achievement. Consequently, the small number of students mastering the Grade Three Diagnostic Test resulted in limited variability of the dependent variable, which could have caused the noted effects.

One proposition is that the ineffective design of the Grade Three Diagnostic Test may have contributed to poor student achievement (Volante, 2005). This ineffectiveness in the design could have resulted from the exclusion of several necessary curriculum measures (Volante, 2005). Given that the study used secondary data, the reliability assessment of the Grade Three Tests was not confirmed.

The differing results from the two cross-sectional analyses have led to an indeterminate response to the hypothesis which stated that the standardised academic test scores of children in primary institutions would increase when taught by teachers who have specialised training in education.

**Teachers’ Years of Experience**

The findings for the teachers’ years of experience variable also had mixed results for both cross-sectional analyses. The block containing the cluster of variables representing teachers’ years of experience was a statistically significant predictor for student achievement in the cross-sectional analysis using Grade Four data but was not in the Grade Three data. While the overall block was statistically significant for the Grade Four data, only the contrast of 31 to 45 years of experience versus one to 10 years, was statistically significant. The negative direction in the results, suggests that teachers were more effective in their initial years with this effectiveness decreasing over time (Chingos & Peterson, 2011; Huang & Moon, 2009; Kane et al., 2008).

Furthermore, results from the Grade Three cross-sectional analyses concurred with the findings from other research which submitted that teachers’ years of experience did not affect students’ achievement (Muñoz & Chang, 2007).
Nonetheless, the conclusions of both cross-sectional analyses supported the discussions that although teachers’ years of experience was a valuable predictor of student academic performance, the generalisation of the result was limited (Muñoz et al., 2011). The current study supported this discussion because, within the same study, two different cross-sectional analyses showed the significance and non-significance for teachers’ years of experience as a predictor for student academic achievement. Hence, the conclusion is that generalisation was limited. The limited variability of the Grade Three data could also be a factor contributing to the non-significance of teachers’ years of experience on student results. While the Grade Four data had 43% of the teachers with one to 10 years of experience compared to 36% for the Grade Three data, it could be argued that this difference may have contributed to the Grade Four teachers’ years of experience showing an association with students’ results and Grade Three showing none.

The current research found that where teachers’ years of service was a valid predictor of student academic achievement, the academic test scores of children in primary level educational institutions increased when they are taught by teachers with fewer years of experience.

**Longitudinal Analyses of Teachers’ Characteristics**

The longitudinal analysis of teachers’ specialised training in education had mixed results. The block containing the Grade Four teachers’ training in education variable was statistically significant in predicting student achievement of the Grade Four Literacy Test. However, the block containing the Grade Three teachers’ training in education in the same analysis was not a statistically significant predictor of the same test. This pattern of results suggests that the current year teachers’ training in education influenced student achievement. However, Grade Three teachers’ training in education did not have an accumulated effect over time.

Like the cross-sectional analyses, the longitudinal analyses for Grade Four teachers’ years of experience clustered variable was statistically significant, but the Grade Three was not. Similarly, the results showed that Grade Four teachers, with one to 10 years of experience, were more effective on students’ academic scores than teachers with 31 to 45 years of experience. The fact that the Grade Three teachers’ years of experience was not statistically significant in the longitudinal analysis also meant that there was no accumulative effect of this variable on the academic achievement of students’ test results.

The findings of both teachers’ specialised training in education and teachers’ years of experience are inconsistent with the results from other researchers (Heck,
2009; Muñoz et al., 2011; Sanders & Rivers, 1996) but supports the findings from other studies (Bressoux & Bianco, 2004; Early et al., 2007; Muñoz & Chang, 2007). One research implication is that the accumulation effect for the Grade Three teachers’ training in education and teachers’ years of experience were absent because of the design of the longitudinal assessment which controlled for Grade Three student achievement. Hence, the impact of Grade Three teachers’ training and years of experience did not affect the Grade Four students’ performance.

**Student Gender**

The results from both cross-sectional analyses and the longitudinal analysis confirmed that gender was consistently a statistically significant predictor for the standardised academic test scores for students in primary institutions. The overall result from the three studies showed that female students were about two times more likely to attain mastery in their standardised test scores than males. These findings were congruent with prior studies from the Caribbean (Figueroa, 2007; Plummer, 2007). Based on the results, student gender hypothesis was confirmed. The outcome suggests that the standardised academic test scores of female students in primary level educational institutions will be higher than that of males. Researchers have suggested possible reasons for the imbalance in the academic achievement of females and males, for instance, gender socialisation in-home and community (Figueroa, 2007) and the level of non-cognitive development of males when compared to that of females (Cornwell et al., 2013). The challenge for all is to find strategies which will result in equality in the educational achievement for both females and males.

**School Location**

The school location hypothesis had mixed results. A statistically significant finding from the cross-sectional Grade Four data and longitudinal analyses showed that students attending schools in rural communities were 1.8 times more likely to score higher on their standardised test results than students attending schools in urban locations. This finding is dissimilar to studies done in the Caribbean and Latin America (De Lisle et al., 2010; Valdés et al., 2008). The skewed data which resulted from matching student and teacher information may have contributed to the disparity in the findings from this study. At the end of the matching process, about 80% of the students in the analysis attended schools located in rural communities. This percentage of rural to urban student population is inconsistent with national
trends. Given the data limitations and the inconsistency in the findings, there are no suggestions for policy or school administration changes.

**Prior Year Test Scores**

The variable in the longitudinal analysis, which had the highest predictive capabilities was the Mastery of the Grade Three Diagnostic Test. The results showed that students who mastered this test were ten times more likely to excel at the Grade Four Literacy Test. This result concurred with other studies (Bassey, 1975; Wickstrom, 1999). Most of the studies examined in this paper did not include prior test results in their research design. The exclusion of controlling for previous test results would remove the accumulative effect of teachers’ characteristics as observed in the longitudinal findings from this study.

**Conclusion**

In response to the question: Is the relevance of the academic training received by primary level educators and the number of years of experience associated with the academic development of students in primary schools?, these data indicate mixed findings for the relevance of academic training and the number of years of experience. Importantly, this study showed that, where years of experience predicted students’ achievement, the academic test scores of children in primary level educational institutions increased when they are taught by teachers with fewer years of experience.

In the case of the question: Do student gender and school location predict the relationship of teacher characteristics to the academic achievement of students in primary schools?, the findings consistently showed a predicting effect of student gender on students’ academic achievement. On the contrary, school location was inconsistent as a predictor for students’ achievement. The use of secondary data and other limitations contributed to this finding in the current study. Opportunities to advance the knowledge gap in this area could be achieved using primary data collection, where the study could be designed to overcome these limitations.

This study found that teachers’ specialised training in education and teachers’ years of experience were inconsistent predictors of students’ academic achievement. Scholars submitted that other areas, such as instructional practices and teacher attitudes, were found to be more effective in improving student achievement (Palardy & Rumberger, 2008). This could be a research opportunity, as it is critical
to ascertain the predictors of student achievement, given that the advancement of students in primary schools is essential to their continuous development and in the long run, by extension will impact national economic progress.

References


Notes on Contributors

**MARTIN HENRY (Late)** was the Manager of Projects and Operations, School of Graduate Studies, Research & Entrepreneurship, University of Technology, Jamaica. He was a founding member of the Caribbean Research and Innovation Management Association.

Qualifications: MA, Media and Communication, BSc Natural Sciences, Diploma, Science Education, The University of the West Indies, Mona, Jamaica; Diploma, Project Management, Jamaica Institute of Management; Diploma, Journalism, and Certificate in Small Business Management.

Research interests: research management, higher education administration, education policy and development, science, technology and innovation policy and development.

**PAUL IVEY** is an Associate Professor and Associate Vice President, School of Graduate Studies, Research & Entrepreneurship, University of Technology, Jamaica. Founding member and President of the Caribbean Research & Innovation Management Association.

Qualifications: PhD and MSc (Insect Biology and Environmental Planning & Management), Louisiana State University, USA; MEd (Adult Education/Lifelong Learning), Mount St. Vincent University, Canada; BSc (Agricultural Science), University of the West Indies, St. Augustine, Trinidad & Tobago.

Research interests: applied entomology, andragogy, research productivity, innovation, and impact of HEIs.

**TASHOYA STREET** was a staff in the School of Graduate Studies, Research and Entrepreneurship, at the University of Technology, Jamaica. Founding member and President of the Caribbean Research & Innovation Management Association.

Qualifications: MSc. in Government, BSc in International Relations, and Certificate in Project Management from the University of the West Indies, Mona, Jamaica.

Research interests: Academic and public policy development and analysis, project management, and research management.

**NICOLE OLA CAMERON** is a lecturer in the Faculty of Education and Liberal Studies at the University of Technology, Jamaica, She has a PhD. Communication.

Research interest: Media effects on health beliefs, attitudes, norms and behaviours within a social justice framework.
**Nola P. Hill-Berry** is a Lecturer and Programme Director in the College of Health Sciences at the University of Technology, Jamaica.

*Qualifications:* Ed.D. University of Huddersfield; MBA University of Phoenix; Bachelor of Health Science degree in Health Administration, and Post-Graduate Diploma in (Adult) Education from the University of Technology, Jamaica.

*Research interests:* leadership for organizational effectiveness, professional development, and leadership in health information management.

**Abubakar Usman** is a lecturer in the College of Health Sciences at the University of Technology, Jamaica.

*Qualifications:* MSc. Nursing Education, RN.

*Research Interests:* cardiovascular disease prevention, and knowledge translation.

**Reneisha Stephenson** is a nurse at the Cornwall Regional Hospital.

*Qualifications:* BSc. Nursing, RN.

*Research Interest:* nutrition and health

**Anastasia Gooden** is a nurse at the Cornwall Regional Hospital.

*Qualifications:* BSc. Nursing, RN.

*Research Interest:* nutrition and health

**Tashia Lyn Campbell-Hyatt** is a nurse at the Cornwall Regional Hospital.

*Qualifications:* BSc. Nursing, RN.

*Research Interest:* prevention of non-communicable diseases

**Theon Hines** is a nurse at the Cornwall Regional Hospital.

*Qualifications:* BSc Nursing, RN.

*Research Interest:* nutrition and health

**Shanique Martin** is a nurse at the Cornwall Regional Hospital.

*Qualifications:* BSc Nursing, RN.

*Research Interest:* cancer

**Racquel Burton-Edwards** is a lecturer in the Caribbean School of Nursing, Midwifery Department, at the University of Technology, Jamaica.

*Qualifications:* MSc. Nursing Education, University of the West Indies, Mona; BSc., Nursing, University of Technology, Jamaica/Excelsior Community College; Certificate,
Midwifery, Kingston School of Midwifery; Registered General Nursing, Kingston School of Nursing.

Research Interests: nursing, midwifery, nursing and midwifery education, clinical care, practice and outcome

CHRISTINE JACKSON is in the Caribbean School of Nursing, at the University of Technology, Jamaica.
Qualification: BSc Nursing
Research Interest: nursing

ANTOINETTE JACKSON is in the Caribbean School of Nursing, at the University of Technology, Jamaica.
Qualification: BSc Nursing
Research Interest: nursing

INDIANA MCLEOD is in the Caribbean School of Nursing, at the University of Technology, Jamaica.
Qualification: BSc Nursing
Research Interest: nursing

JUDITH MENDEZ is in the Caribbean School of Nursing, at the University of Technology, Jamaica.
Qualification: BSc Nursing
Research Interest: nursing

STACIAN WALKER is in the Caribbean School of Nursing, at the University of Technology, Jamaica.
Qualification: BSc Nursing
Research Interest: nursing

AMANDA MONIQUE DALEY works at the Bustamante Hospital for Children, and the National Health Fund in Jamaica.
Qualifications: Doctor of Pharmacy Degree, and Bachelor of Pharmacy Degree
Research interest: pharmacist-led intervention

LISA ELAINE BROMFIELD is a lecturer in the College of Health Sciences, at the University of Technology, Jamaica.
Qualifications: Doctor of Pharmacy Degree, PharmD, Cum Laude. 
Research interest: infectious diseases

KIRKLAND ROWE is a lecturer in the Faculty of Engineering and Computing in the University of Technology, Jamaica.
Qualifications: MPhil in Mechanical Engineering, University of Technology, Jamaica.
Research interests: energy systems, energy management and policy, refrigeration and air conditioning, energy storage, and renewable energy.

NOEL M. BROWN is a professor and the vice-president of technology innovation at the Caribbean Maritime University in Jamaica.
Qualifications: PhD. in Mechanical Engineering, University of Oklahoma, MSc. Mechanical Engineering, University of Oklahoma, and MSc. Aeronautical Engineering, Kiev Institute of Civil Aviation Engineers (KIIGA).
Research interests: heat and mass transfer, fluid flow, energy storage, renewable energy, electrohydrodynamic, cooling of electronic components in the aircraft industry, and environmental sustainability.

THERESE V. CHAMBERS is the programme director for the electrical engineering programme in the Faculty of Engineering and Computing.
Qualification: PhD. in Electrical Energy and Power Systems, University of Manchester, UK.
Research interests: renewable energy, distributed energy generation, energy efficiency, and storage and data management.

ELECIA JOHNSON has an MSc. in Business Administration University of South Wales, University of Technology, Jamaica
Research interest: education and administration

LISA FACEY-SHAW is a senior lecturer in the School of Computing and Information Technology, at the University of Technology, Jamaica.
Research Interests: technology-enhanced learning, computing education, introductory programming, and distance learning.
SOPHIA MCNAMARA is a senior lecturer in the School of Computing and Information Technology, at the University of Technology, Jamaica.

Qualifications: MSc. in Computer-Based Management Information Systems, University of the West Indies, Mona; BSc. in Computer Studies; and Diploma in Education.

Research Interests: software engineering, data mining, and computing education.

JUNIOR MARTIN is a senior lecturer and the head of the School of Vocational and Technical Education in the Faculty of Education and Liberal Studies, University of Technology, Jamaica.

Qualifications: Ed.D., MSc., B.Ed., and Diploma in Education.

Research Interests: integration of ICT in the Curriculum, technical and vocational education, distance education, leadership in higher education, and adult education.

SHALIEKA BURRIS is a lecturer in academic writing at the University of the Commonwealth Caribbean, and a part-time lecturer in academic writing at the University of Technology, Jamaica.

Qualifications: Master of Arts in Linguistics (University of the West Indies, Mona), B.A in Linguistics (University of the West Indies, Mona), and Dip.Ed (Shortwood Teachers’ College).

Research Interests: applied linguistics, sociolinguistics, academic literacy, and adult teaching and learning.

TASHIEKA BURRIS-MELVILLE is a lecturer in academic writing at the University of Technology, Jamaica.

Qualifications: Ed.D. Candidate (Trevecca Nazarene University), Master of Arts in Linguistics (University of the West Indies, Mona), B.A in Linguistics (University of the West Indies, Mona), and Dip.Ed. in Spanish and Linguistics (Shortwood Teachers’ College).

Research Interests: applied linguistics, sociolinguistics, leadership and professional practice, academic writing/literacies in higher education, and online teaching.

MELVA ARMSTRONG is a lecturer in Finance in the College of Business and Management at the University of Technology, Jamaica.

Qualification: MBA., Manchester Business School/University of Wales.

Research interest: digital disruption from an organisational behaviour perspective.
The Journal of Arts, Science, and Technology is published three times a year in March, July, and November by the University of Technology, Jamaica.

**Manuscript Submission Guidelines**

*The Journal of Arts, Science, and Technology (JAST)* is an international, multidisciplinary, peer-reviewed journal aiming to promote and enhance research and technology in diverse fields of knowledge, including architecture, arts, business management, computing, education, engineering, finance, health, hospitality, law, liberal studies, marketing, pharmacy, sports, and urban planning. *JAST* is published by the University of Technology, Jamaica, and is intended for readers in the scholarly community and for professionals in industry. Besides research papers, the journal welcomes scholarly book reviews, conference papers, and commentaries. *JAST* is published three times in one year. Each issue will include the following sections: editorial, research papers, book reviews, conference reports, and industry viewpoints. A range of papers is encouraged, including evidence-based research papers (empirical, replication, literature review, theoretical, or methodological articles), and personal reflections. In addition to research-based papers, we welcome papers on industrial perspectives for the “Industrial Issues” section of the journal. Any academic referencing style (APA, MLA, Chicago, etc.) may be used based on Author(s) discipline. Author(s) should use Calibri, double spacing in MS Word document, and 12-point font, and left align.

- **Title page:** the front page of the paper should include: title of the paper, name, affiliation, postal address, and email for each Author.
• **Abstract**: this should be no longer than 250 words, and should summarize the research problem and its significance, the methodology used, key findings, analysis and interpretation of the findings, and conclusion.

• **Keywords**: three to five words, phrases, or acronyms.

• **Introduction**: background, rationale, purpose of the study, research objectives, research questions, hypothesis, review of relevant scholarship, etc.

• **Body of Paper**
  
  o **Method**: research design, inclusion and exclusion criteria of participants, sampling procedures, data collection, procedures, data analysis, reliability and validity, ethical issues considered, etc.
  
  o **Results/Findings**: discuss major findings according to research questions/objectives with the literature, support or refute findings, alternative interpretations, study limitations, implications, etc.
  
  o **Conclusion**: concluding remarks on major findings and recommendations, etc.

• **References** in discipline-appropriate style

• **Acknowledgements** (optional)

• **Appendix** (optional)

• Each author should submit with their paper a brief profile indicating highest qualifications, academic base, and research interests.

**Paper Review Process**

• Receive and acknowledge to the author(s) receipt of the paper

• Each paper will be peer reviewed by at least two experts in the field for originality, significance, clarity, impact, and soundness, etc.

• Paper may be accepted or rejected, or the author(s) may be asked to revise paper, etc.

• Author(s) notified, will be asked to send in bio-data if not previously submitted

• Paper published

**Note:**

• Journal articles should not be more than 6,000 words

• Industry Notes should be at least 600 words

• Papers should be submitted electronically to jasteditor@utech.edu.jm
The School of Graduate Studies, Research & Entrepreneurship leads and manages the development and delivery of graduate programmes in line with international standards and best practices. Directed by the research mandate of the University, the School guides and supports research activities, with a particular focus on inter-disciplinary and applied research relevant to economic and social problems/needs. As an income-generating centre of the University, the School guides and supports entrepreneurial activity primarily through the delivery of consultancy services and the creation of research & development innovations. The School provides guidance and supervision for the academic publications of the University and is responsible for the *Journal of Arts Science and Technology (JAST).*