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Research Paper

The influence that self-efficacy has on lecturer's technology adoption

ABSTRACT

Educational technology is a learning tool that helps lecturers enhance learning through instructional practices however, it is unclear why lecturers have difficulties adopting technology. The purpose of this study was to examine how lecturers' self-efficacy at one college in Antigua and Barbuda influenced their technology adoption in terms of their instructional practices, including perceived barriers and supports for technology use. The conceptual frameworks for this study were Bandura's self-efficacy theory. The study included nine lecturers from a Caribbean college in Antigua and Barbuda. Data were collected through interviews and analyzed using open coding and thematic analysis. Findings from the study were that college lecturers' beliefs regarding technology were positive and technology held value in terms of the learning process. However, the results established that not all lecturers were comfortable adopting technology within their instructional practice and faced barriers when attempting to adopt technology. Lecturers indicated the need for professional training, institutional support and observational learning of others which would assist with lecturers' pedagogy, content knowledge and technology adoption. The results of the study may lead to social change by revealing potential barriers that lecturers face during technology use. The study can also provide both lecturers and stakeholders with data that is Caribbean-specific and can provide the most effective plan to support lecturers' adoption of technology.

Key words: Self efficacy, lecturers self confidence, technology adoption.

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INTRODUCTION

The school system in the Caribbean is unique and significantly different from those of developed countries. Many teachers in the Caribbean use corporal punishment to discipline students in the classroom for behavioral issues or to assist students in learning concepts or shaping negative student behavior. Teachers are also referred to as lecturers. Many lecturers conduct their classes through the mode of teacher-centered learning. This mode can become problematic. Within higher education platforms, experienced college lecturers often have trouble adapting to changing students who learn differently from the students they once taught. They may also find it challenging to adapt to the new educational technologies that support and promote learning. As a result, college lecturers may have difficulties effectively executing lessons to their

students in ways that support how these individuals now learn. Prensky (2014) said that contemporary students' brains are different from those of previous generations, which has caused lecturers to face difficulties in terms of effectively understanding the way these students learn. Younger students have grown up in the age of technology and often prefer that their learning is executed in new and exciting ways, preferably through student-centered use of technology. Past generations were subjected to teacher-centered learning, where teachers held the wealth of information and divulged it to their students (Masingila et al., 2019). Saxena (2017) said technological tools within the lecturers' instructional practices can lead to positive outcomes within the classroom. By working toward this vision, college lecturers can transform the classroom

environment into one that will enhance learning and assist with the preparation of students to become computer literate individuals. These necessary skill sets provide students with the essential skills to acquire necessary computer literacy needed to work competitively within the workforce (Venkatesh et al., 2016).

Positive outcomes can only be achieved once technological tools are adequately and successfully implemented (Masingila et al., 2019). Once successful adoption occurs appropriately, it will allow for successful moments within the classroom and a more significant learning experience for all involved. As new educational technology tools continue to emerge, extensive research supporting education technology's effectiveness and its benefits on students' learning have been established. Many college lecturers still find difficulties employing these tools within their lecturer-based classrooms. These difficulties occur even after knowing that successful adoption of educational technology can lead to changes within the learning process among students. Masingila et al. (2019) said even though technology adoption is a meaningful tool that can promote a positive learning environment in terms of students' success, if the adoption process is not done correctly, it will not provide a better learning environment for students. Alemu (2015) said despite college lecturers' interest in technology adoption, they face several challenges that prevent them from adopting technology successfully. According to Khodabandelou et al. (2016), these challenges include teachers' lack of professional development in terms of adoption of technology. It is difficult for lecturers to integrate curriculum and technology when used together. However, lecturers continue to see technology adoption as complete and distinct from the classroom environment. Therefore, lecturers' technology competency and knowledge skills are vital in terms of instructional practices. However, if lecturers lack the confidence to use technology, then both students and lecturers may find themselves at a disadvantage within the classroom environment.

The term technology adoption is defined as the lecturer's ability to use technology within their instructional practice to foster students' learning and promote positive student outcomes through curriculum using technology in their instructional practices (Hsu, 2010). As lecturers aspire to adopt technology, they may find hindrances that prevent them from being successful. These hindrances can be seen as barriers and may include lecturers' self-efficacy. It may be because of these barriers that college lecturers have found difficulties with the adoption process, causing adoption within the classroom to move at a slower rate. This may be a contributing factor that can influence college lecturers' technology adoption when they are attempting to use Information Communications Technology (ICT) within the classroom. Self-efficacy is influential. It can influence a person's actions, affect their behavior and influence how they think and behave when interacting with others (Kul,

2018). Understanding decision-making factors that lecturers contemplate during their adoption process will help explain lecturers' success and/or failure during their adoption process. Through globalization, technology has changed society and the life of individuals. In the 20th century, there was a mass change in society due to information diffusion and communication technology. Technology ultimately caused the information revolution and shaped education (Khodabandelou et al., 2016; Lawrence and Tar, 2018; Wilson, 2018).

Globalization and technology have enhanced education in terms of computers, mobile devices, and the Internet (Lawrence and Tar, 2018; Ponte and Cullen, 2013). Adopting technology into the education system can help college lecturers provide quality education to whoever and wherever within the world (Khodabandelou et al., 2016; Lawrence and Tar, 2018). According to Wilson (2018), educators should then try and aspire to learn 21st century skills that meet educational needs and the necessary support to assist the ways students are learning. Promoting digital literacy will help in evoking students' critical thinking skills within the classroom (Wilson, 2018). These skills will help students develop the necessary tools to prepare them for work when they leave school. According to Onuoha et al. (2016), English-speaking Caribbean countries have been committed to reaching these 21st century skills. Trinidad and Tobago gave away $73,200 in laptops to students and teachers costing $255 million to enhance technology (Phillip et al., 2017). Other regions that participated in this government initiative were St. Vincent and the Grenadines, Jamaica, Trinidad, Antigua, and Barbuda. These countries distributed laptops to students, teachers, college lecturers and the local community to promote ICT adoption and promote ICT competency (Iyare et al., 2018; Onuoha et al., 2016). This endeavor was aimed to equip every household with the ability to become technologically literate by providing citizens with the technological skills (Iyare et al., 2018). Antigua and Barbuda were examples of an English-speaking Caribbean territory that supported this task through the implementation of Technological Community Access Centers. According to Khodabandelou et al. (2016), college lecturers' issues regarding technology adoption include internet connectivity failure, online course tool failure, and outdated or broken devices in computer labs.

Within the Caribbean, professional development for college lecturers regarding technology use is insufficient and negatively affects college lecturers' confidence in terms of using technology (Kut, 2018; Onuoha et al., 2016). There is inadequate support when lecturers attempt to adopt technology in the classroom and they lack time to learn new technological tools (Guzmán, 2018; Kut, 2018; Onuoha et al., 2016). Although stakeholders and persons within the Antigua and Barbuda education system believed in technology adoption, few policies support the initiative of becoming competent and adopting technology within

lecturers' classroom. This study is useful because it will fill a gap in knowledge regarding challenges college lecturers face in terms of technology adoption within their specific subject area from a Caribbean perspective. Presently, there is not much literature on college lecturers' experiences within the Caribbean regarding their technology adoption and the necessary support required with this adoption within their specific subject area. It was found that most literature was written from a western industrialized perspective, and it proved to be challenging finding current information about Latin America and other developing countries regarding technology adoption. The study will also provide information that will influence policy and help in terms of making necessary adoption changes. Such changes could lead to policymakers supporting the technology adoption process for college lecturers and students. Once stakeholders are invested in the cause, they will be more mindful of inadequate infrastructure, resources needed and lecturers' recommendations to bring about educational reform.

Although several gaps and problems have been identified within the study, my primary focus was on lecturers' barriers to adoption within the English-speaking Caribbean and beliefs regarding their self-efficacy in terms of adopting technology. Research and empirical evidence have revealed the benefits and necessity of equipping students with 21st century tools. It is unclear to college lecturers what barriers they face within their instructional practices and additional supports they perceive that they may need to implement technology in Caribbean tertiary colleges successfully. Lecturers' self-efficacy beliefs may be influential in terms of not adopting technology within their instructional practice. Currently, college lecturers at the Zendejay college are not adequately adopting education technology within the classroom, preventing students from acquiring 21st century skills needed to function adequately within the workforce (Ramorola, 2014). However, college lecturers know the benefits of ICT, but many find it challenging to make connections using technology at home and transferring it within their instructional practice (Kimmons and Hall, 2016; Onuoha et al., 2016). Many possible factors may contribute to this problem. These problems may include the preferred mode that lecturers choose to teach, barriers to adoption, culture of adoption, lack of understanding of how to use new technology, inability to evaluate adequately the degree of success or impact that technology has and college lecturers' status as digital immigrants. These factors may be related to college lecturers' self-efficacy.

Self-efficacy can play a significant role in college lecturers adopting technology within their subject area and has the power to influence tasks that a person may engage in (Bandura, 1977, 1986, 1998). However, the lower the lecturer's self-efficacy is, the more the task will be avoided. Individuals who have a higher self-efficacy level may seem to be more persistent when using technology and will embrace what technology offers to achieve their goals. This research will help fill a gap within the literature regarding barriers college lecturers perceive when using technology in their instructional practices and additional supports they perceive they may need to implement that technology in Caribbean tertiary colleges successfully. It will also fill a gap in the literature related to lecturers' perceptions of their self-efficacy regarding adopting the technology. At present, information regarding lecturer barriers and their specific self-efficacy level related to technology is unknown. The Caribbean faces educational challenges compared to some developed and developing countries. There are many constraints to consider in the Caribbean that would not be present within an industrialized country. Although college lecturers agree that technology adoption helps students succeed, they often find it challenging to adopt technology successfully and consistently within their subject area due to barriers (Onuoha et al., 2016).

LITERATURE REVIEW

Self-efficacy is how a person views their capabilities through reflection, internalization, and actions (Bandura, 1977). Xia (2017) defined self-efficacy as the ability or belief that a person has to execute an action and achieve desired outcomes. Self-efficacy influences whether individuals perform specific tasks, which then causes their learning to be controlled by a specific behavior or environmental factor (Xia, 2017). Bandura (1998) said individuals who perform at high levels have high self-efficacy and engage and participate in projects faster and more willingly than those who have low self-efficacy and are slower and disengaged. Persons with high self-efficacy believe in their capabilities and are not afraid of new challenges or difficult tasks (Lemon and Garvis, 2016). However, individuals with low self-efficacy doubt their skills. Efficacy expectation is dependent on how much exertion is necessary to complete a task and how much time is spent working out challenges. If an individual's perceived self-efficacy is strong, they will put forth greater efforts to accomplish a task than individuals with low self-efficacy. Persisting with activities perceived to be challenging allows individuals to gain experiences strengthening their self-efficacy. Conversely, individuals who do not face challenges and choose not to complete tasks may experience lowered self-efficacy and increased fear in terms of facing challenges and completing tasks (Bandura, 1977, 1986, 1997). People often become defensive or fearful when they are afraid of failure, for they do not want to look incompetent or have self-doubt. These feelings cause individuals to avoid or choose not to complete difficult tasks.

Individuals with low self-efficacy foresee failure in terms of change and they doubt success can come about through organizational change. Individuals with these qualities will also give up easier if required skills or sub-skills seem

challenging (Bozbayindir and Alev, 2019; Schunk, 1995). Self-efficacy is a powerful tool that can be used to predict individuals' behaviors and how they perform specific tasks. Self-efficacy is a contributing factor in terms of performing well in academics (Bandura et al., 1996; Xia, 2017). Individuals who have a strong sense of self-efficacy participate more readily in tasks and work more diligently when encountering stressful situations (Bozbayindir and Alev, 2019; Margolis and McCabe, 2004; Xia, 2017). Self-efficacy influences how individuals choose activities and how long they plan to engage in them (Bozbayindir and Alev, 2019). However, although self-efficacy influences performance, it is not the sole determining factor of behavioral success, especially if an individual's will and abilities are deficient (Bandura, 1977, 1986, 1997). According to Chemers et al. (2001), when a situation is perceived as challenging or threatening, self-efficacy affects how individuals experience the relationship between situational demands and coping resources. If lecturers coping resources are insufficient, then a threat occurs and individuals may avoid the challenge. However, if lecturers coping resources are adequate to meet situational demands, then the individual will take up the challenge. People with high self-efficacy will have the confidence to acquire enough resources to meet situational demands (Xia, 2017). A person's self-efficacy influences people's actions and behaviors more than their skills and capabilities (Bozbayindir and Alev, 2019; Ertmer and Ottenbreit-Leftwich, 2010; Oskay, 2017; Xia, 2017). Therefore, it is crucial to foster and develop self-efficacy in individuals. By encouraging lecturers through support, reinforcement and incentives, low self-efficacy can be improved.

Some strategies to improve self-efficacy as suggested by Bandura (1977) include reinforcing activities. Bandura shared that these activities can assist struggling learners especially when a mentee is able to share their experiences with others. Moreover, going slow so that concepts can be understood, breaking down the frequency of extrinsic reinforcement, providing strategies for improvement and listening to learners' struggles can help better understand problems lecturers face and build confidence level. Lastly, by modeling behaviors with clear outcomes, using verbal persuasion, which can influence behaviors and emotional arousal to cope with stressful outcomes and threats, lecturers can use these techniques to build their self-efficacy. Schunk (1995) provided an intervention strategy to enhance self-efficacy, which included goal setting, feedback to influence self-efficacy, and modeling of effective behaviors. Positive verbal persuasion, mastery and sharing experiences can encourage individuals to build up their beliefs and improve self-efficacy (Bandura, 1977, 1986, 1998). In support of Bandura's (1977) theory of self-efficacy, Moller et al. (2008) indicated that college lecturers' can increase their self-efficacy with technology adoption by having positive experiences with computers and classroom technologies (Oskay, 2017). If educators can attest to how

technology promotes students' success and engage college lecturers in the technologies, then college lecturers' confidence and self-efficacy will increase (Bozbayindir and Alev, 2019; Lee and Lee, 2014; Oskay, 2017).

Teacher efficacy

Teacher efficacy is defined as a lecturer's attitude or feelings about his or her ability to perform a task (Bandura, 1977, 1986, 1997). Hoy (2000) defined teacher efficacy as the confidence needed to promote student learning. It allows college lecturers to step out of their comfort zone and increase their willingness to invest their efforts to support students' learning and promote persistence. According to Tschannen-Moran et al. (1998), when a lecturer has a high level of self-efficacy, college lecturers will improve their performance while increasing their self-confidence. It is vital to examine a lecturer's self-efficacy level to improve the present education system (Hatlevik, 2017; Oskay, 2017). However, several researchers have demonstrated that the knowledge college lecturers hold regarding technology is a clear indicator of whether the knowledge obtained would influence the technology adoption (Keengwe and Maxfield, 2015; Kim et al., 2013; Sadaf et al., 2012). Kim et al. (2013) further explained that college lecturers whose pedagogy included the need for student-centered learning were often the ones that used technology within their subject matter more passionately. Teacher efficacy is an important mediating factor in the decision-making process to use technology appropriately by educators within the classroom (VanderNoor, 2014).

Teacher efficacy influences the lecturer's belief of whether the students can absorb information under the lecturer's instruction (Banas and York, 2014). A teacher's efficacy will ultimately assist with the lecturer's judgments and feedback over their years, assisting in constructing college lecturers' beliefs. Through these beliefs, college lecturers analyze whether their beliefs and the outcome will be successful (Siddiq and Scherer, 2016). An analysis of their teaching task or competency skills comes into question. It is at this point that their perceived sense of efficacy will influence decisions either negatively or positively. Lastly, the outcome of the performance will be displayed based on the decision made by the lecturer. Yerdelen et al. (2019) acknowledged that a lecturer's belief is more influential than the lecturer's knowledge. The lecturer's belief can powerfully impact teaching practices either negatively or positively. Kim et al. (2013) indicated that although one wishes to discover the impact of self-efficacy and teacher efficacy on lecturer's adoption, their fundamental beliefs need to be addressed to understand better how technology is fundamental to education.

Developing lecturers' efficacy

A lecturer's level of confidence can be influenced by past

experiences and the culture of the education system they are a part of. However, stakeholders and administrators can assist in reforming these beliefs. Hoy (2009) stated that vicarious experiences of watching other educators perform successful outcomes would help them build their self-esteem and encourage college lecturers to feel that they can reach the same outcome. Social persuasion is another way to build up a teacher's self-efficacy. Social persuasion could take the form of feedback, training, consultation and pep talks (Hoy, 2009). Lastly, the use of professional learning also can enhance efficacy. If one wishes to bring about change, a more in-depth investigation of how one can alter one's self-efficacy beliefs is necessary (Krause et al., 2017). Pajares (1992) postulated that understanding lecturer's beliefs, as well as their implementation strategies can help inform stakeholders of educational practices.

Self-efficacy and use of educational technologies

As lecturers realize that technology has become an integral part of their instructional practices, the lecturer's self-efficacy has prevented them from implementing these educational technologies successfully (Henderson et al., 2015). O'Neil and Krause (2019) shared that lecturers' inexperience with technological skills may cause this. They further stated that it is essential for lecturers to have technological skills when attempting adoption. These include both based knowledge, instructional knowledge with digital technologies and the ability to shadow faculty that are proficient with technology (O'Neil and Krause, 2019). Karsh (2018) concurred with O'Neil and Krause and expresses that one of the main problems that lecturers face during implementation is their lack of ability to adopt the technology (Durff and Carter, 2019). They further expounded that lecturers have even had technology anxiety due to lack of competence and inadequacy with technology training (Karsh, 2018). This impacts the lecturer's self-efficacy. In a study conducted by Olson and Appunn (2017), 264 individuals participated in a quantitative survey and it was found that there was a correlation between technology adoption and self-efficacy. A lecturer's attitude and or beliefs can determine whether or not they will adopt the technology. Another study by Jokisch et al. (2020) also demonstrated that self-efficacy is influential on the lecturer's action to use educational technology tools. They concluded by saying that today's current generation, specifically looking at older lecturers, may be experiencing difficulties with technology adoption. This may be occurring because they have low self-efficacy when attempting to facilitate learning through technology adoption. These lecturers do not have the requisite training or any substantial learning to technology within their formative years. However, their study demonstrated that lecturers who successfully used technology and adopted it more efficiently within their instructional practice had a higher self-efficacy level related to modern technology and were competent with technology skills.

METHODOLOGY

The study consisted of a Basic Qualitative study and its aim was to understand Zendejay College lecturers' perceptions of their self-efficacy in terms of implementing technology in classroom instructional practices. The research question was the following:

RQ1: What are college lecturers' beliefs regarding self-efficacy in terms of adopting technology in their current position at Zendejay College?

The sample size for the study was eight lecturers from the Zendejay College and all persons answered the research questions and provided an understanding into the phenomenon being investigated. The college lecturers were taken from the various department at Zendejay College. This included: The Department of Education, the Department of Business, the Department of Pharmacy and the Department of Undergraduate Studies. Criterion sampling was the method used to recruit the adequate participants needed for the research. The criteria set for the study were as follows: College lecturers must have more than 3 years' experience lecturing at the Zendejay College to express clearly their views that they have experienced over enough years. The second criterium was the cross section of the participant age. Although it was not the main focus of the study, it allowed for a different cross section of the participants' ages, which provided a wide range of perspectives by the participants. Interviews were the instrument used to collect data from the participants and the interview questions were designed to answer the research questions and provided credence to the conceptual framework and literature review. Moreover, all 8 of the interviews were conducted over the telephone and consisted of 20 questions. The allotment of time given for each interview was a minimum of 1-hour minimum and all interviews were conducted in a 2- weeks period. Data analysis was ongoing from the beginning to the time of transcription to ensure all questions were answered thoroughly. After the data was collected from participant interviews, the data was transcribed. The data was transcribed and a line-by-line analysis was ensued. This step helped bring about the richness from the participant's data.. After the open coding process, repetitiveness from the data was sought. The codes were then placed in categories and further broken down into themes. My findings were member checked by the participants to ensure the data was interpreted correctly. The participants revalidated some of the concerns and emphasized that they hoped that stakeholders would take the findings seriously. This step ensured credibility, validity and the accuracy of

RESULTS

It was revealed that all 8 lecturers felt that technology provided value and therefore, it would be important to use it within a classroom setting. Within the data, it was demonstrated that when lecturers believed that technology has value and benefit, then their ideology will influence their self-efficacy level and mediate their behavior. Moreover, whether good or bad, this belief can influence lecturer's performance, causing their beliefs to be predictive of the behavior that the lecturers may believe. When analyzing the data further it was found that four of the eight lecturers exhibited a high self-efficacy belief and confidence level. It was revealed that they held a higher level of resilience to technology adoption. The findings also showed that lecturers that were more committed to obtaining a successful outcome with technology adoption were very receptive and motivated to using technology for they found value from these technological tools within their instructional practice. The findings also demonstrated that participants who believed in the cause of technology adoption and appeared to have a strong level of self-efficacy were influenced more and was motivated and committed to their task to achieve their goals. These lecturers saw challenges as things to be conquered rather than feared. However, those lecturers who exhibited a low self-efficacy belief were less committed to tasks, doubted their skills and were afraid to try new things when they stumbled across technology adoption challenges. Lecturers confidence level was also a determining factor in relation to lecturer's technology adoption.

It was found that seven out of eight lecturers expressed that their confidence is pivotal and it influenced lecturer's attitude or ability to use technology effectively. The data revealed that college lecturers believed that their confidence level influences their self-efficacy when attempting to adopt technology which was displayed through lecturers' stories of their successes and failures with technology adoption. The data also demonstrated how their confidence level played a factor in their technological adoption process. The lecturer's perspectives within the data demonstrated that a person's confidence level influences technology adoption and plays an important role in technology adoption and should be considered when attempting to adopt technology in a lecturer's instructional practice since it can be very influential. Lecturer's self-efficacy was so powerful that it can affect one's beliefs, actions and attitudes. The above discussion articulated how one's self-efficacy influences the decisions as to whether to adopt technology or not within the classroom. The data also demonstrated that self-efficacy is the leading factor that can impede technology adoption through the lecturer's beliefs or actions. If the lecturer's felt a sense of defeat, lack of

knowledge, or stressful workload, they will not be inclined to use technology in their instructional practices and may put up resistance toward using the specific technology.

However, it is important to emphasize that if lecturers felt that technology adoption would provide a sense of value within their learning environment, they would be more inclined to use it and work toward successful outcomes. Lecturer's self-efficacy is a contributing factor to lecturer's decision making as to adopting technology at the Zenejay college. It can be concluded that that Caribbean lecturers are indeed willing to embrace technology adoption. They understand the benefits it brings to assist learning. They are willing and committed to advancing their instructional practices by adopting the necessary technology within their setting. Though lecturers believe that there are hindrances in the way, they still try and attempt technology adoption. Through each triumphant moment during technology adoption, lecturers will begin to empower their students. As lecturers work toward these objectives, the adoption process must be done correctly to achieve this goal. Listening to the lecturers' demands, working together with the administration to provide the necessary support and adequately creating technological policy in consultation with lecturers will help lessen and rectify the barriers faced (Dintoe, 2019).

DISCUSSION AND CONCLUSION

College lecturers felt that technology adoption was necessary for both themselves and their students. Lecturers also felt that technology had significant value in terms of the learning environment. It was further revealed that lecturers' self-efficacy regarding technology could directly or indirectly influence their perspectives. Those lecturers who met adverse outcomes often felt a lack of motivation and negative attitudes when using technology. The results showed that having a high confidence level was instrumental to lecturers' interactions in terms of the technology adoption. Competency skills, computer knowledge, and teaching experiences influence lecturers' technology use. Lecturers who were not familiar with using technology found it difficult to adopt it. Lecturers felt it was exhausting learning new technologies and simultaneously imparting new knowledge. It was very time consuming, especially when technology frequently change. Participants found it difficult to keep up with the latest technology trends, which caused fatigue, burnout and resistance among lecturers.

Further research needs to be implemented regarding lecturer's self-efficacy beliefs and support required in other colleges within other Caribbean territories. There is limited literature that is regionally specific to the Caribbean and Latin America. With limited literature, researchers may have to compare their findings to countries with similar or dissimilar issues. Further research is also needed with

respect to the steps that Caribbean lecturers should go through to help them build their self-efficacy level using their limited resources. This step will provide a deeper understanding of how to build lecturers' self-efficacy during technology adoption and provide quality data that can be used to bridge the gap in the literature. Since technology is continually changing, adapting then practicing technology will also continue to change (Sheftel and Zembrycki, 2017).

REFERENCES

Alemu BM (2015). Integrating ICT into teaching-learning practices: Promise, challenges and future directions of higher educational institutes. Universal J. Educ. Res. 3(3): 170–189. http://files.eric.ed.gov/fulltext/EJ1056082.pdf.

Banas JR, York CS (2014). Authentic learning exercises as a means to influence preservice teachers' technology integration self-efficacy and intentions to integrate technology. Australas. J. Educ. Technol. P 306. https://doi.org/10.14742/ajet.362

Bandura A (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychol. Rev. 84(2): 191–215. https://doi.org/10.1037/0033-295X.84.2.191

Bandura A (1986). The explanatory and predictive scope of self-efficacy theory. J. Soc. Clin. Psychol. 4(3): 359–373. https://doi.org/10.1521/jscp.1986.4.3.359.

Bandura A (1997). Self-efficacy: The exercise of control. Macmillan.

Bandura A (1998). Personal and collective efficacy in human adaptation and change. In J. G. Adair, D. Belanger, & K. L. Dion (Eds.), Advances in psychological science: Vol. 1. Personal, social, and cultural aspects pp. 51–71. Psychology Press.

Bozbayindir F, Alev S (2019). An analysis of the relationship between the general self-efficacy perceptions of teachers and their political skill levels. Int. J. Progress. Educ. 15(2): 65–77. http://files.eric.ed.gov/fulltext/EJ1219211.pdf

Chemers MM, Hu LT, Garcia BF (2001). Academic self-efficacy and first year college student performance and adjustment. J. Educ. Psychol. 93(1): 55–64. https://doi.org/10.1037/0022-0663.93.1.55.

Dintoe SS (2019). Technology innovation diffusion at the University of Botswana: A comparative literature survey. Int. J. Educ. Dev. Inf. Commun. Technol. 15:1. http://files.eric.ed.gov/fulltext/EJ1214258.pdf.

Durff L, Carter M (2019). Overcoming Second-Order Barriers to Technology Integration in K–5 Schools. J. Educ. Res. Pract. 9(1): 17.

Ertmer PA, Ottenbreit-Leftwich AT (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. J. Res. Technol. Educ. 42(3): 255–284. https://doi.org/10.1007/BF02504683

Hatlevik OE (2017). Examining the relationship between teachers' self-efficacy, their digital competence, strategies to evaluate information, and use of ICT at school. Scandinavian J. Educ. Res. 61(5): 555–567. https://doi.org/10.1080/00313831.2016.1172501

Henderson M, Selwyn N, Finger G, Aston R (2015). Students' everyday engagement with digital technology in university: exploring patterns of use and 'usefulness'. J. High. Educ. Policy Manag. 37(3): 308-319.

Hoy AW, Hoy WK, Davis HA (2009). Teachers' self-efficacy beliefs.

Hsu S (2010). The relationship between teacher's technology integration ability and usage. J. Educ. Comput. Res. 43(3): 309–325. https://doi.org/10.2190/EC.43.3.c

Jokisch MR, Schmidt LI, Doh M, Marquard M, Wahl H.-W (2020). The role of internet self-efficacy, innovativeness and technology avoidance in breadth of internet use: Comparing older technology experts and non-experts. Comput. Hum. Behav. Article 106408. https://doi.org/10.1016/j.chb.2020.106408

Karsh SMA (2018). New Technology Adoption by Business Faculty in Teaching: Analysing Faculty Technology Adoption Patterns. Educ. J. 7(1): 5-15.

Keengwe J, Maxfield MB (2015). Advancing higher education with mobile learning technologies: Cases, trends, and inquiry-based methods. Information Science Reference.

Khodabandelou R, That JEM, Selvaraju MA, Ken TY, Kewen Z, Yan Z, Ning TY (2016). Exploring the main barriers of technology integration in the English language teaching classroom: A qualitative study. Int. J. Educ. Literacy Stud. 4(1): 53–58. https://doi.org/10.7575/aiac.ijels.v.4n.1p.53.

Kim C, Kim MK, Lee C, Spector JM, DeMeester K (2013). Teacher beliefs and technology integration. Teach. Teach. Educ. 29: 76–85. https://doi.org/10.1016/j.tate.2012.08.005.

Krause J M (2017). Physical education student teachers' technology integration self-efficacy. Phys. Educ. 74(3): 476–496. https://doi.org/10.18666/TPE-2017-V74-I3-7329

Kul U (2018). Influences of Technology Integrated Professional Development Course on Mathematics Teachers. Eur. J. Educ. Res. 7(2): 233–243. http://files.eric.ed.gov/fulltext/EJ1175354.pdf

Lawrence JE, Tar UA (2018). Factors that influence teachers' adoption and integration of ICT in teaching/learning process. Educ. Media Int. 55(1): 79–105. https://doi.org/10.1080/09523987.2018.1439712.

Lemon N, Garvis S (2016). Pre-service teacher self-efficacy in digital technology. Teach. Teach. 22(3): 387–408. https://doi.org/10.1080/13540602.2015.1058594.

Margolis H, McCabe PP (2004). Self-efficacy: A key to improving the motivation of struggling learners. The Clearing House: J. Educ. Strateg. Issues Ideas 77(6): 241–249. https://doi.org/10.1080/10459880309603362

Masingila O, Khatete W, Maundu N, Foley R, Ndethiu M, Twoli W (2019). From implementation to efficacy: Factors affecting Kenyan secondary teachers' technology integration. Afr. Educ. Rev. 16(1): 58–87. https://doi.org/10.1080/18146627.2016.1224574.

Moller L, Foshay W R, Huett J (2008). Implications for instructional design on the potential of the web. Tech. Trends 52(4): 66–70. https://doi.org/10.1007/s11528-008-0179-0

O'Neil K, Krause JM (2019). Physical education teacher education faculty self-efficacy toward educational technology. Phys. Educ. 76(5): 1287–1305. https://doi.org/10.18666/TPE-2019-V76-I5-9107.

Oskay ÖÖ (2017). An investigation of teachers' self-efficacy beliefs concerning educational technology standards and technological pedagogical content knowledge. Eurasia J. Math. Sci. Technol. Educ. 13(8): 4739–4752. https://doi.org/10.12973/eurasia.2017.00961a

Pajares MF (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. Rev. Educ. Res. 62(3): 307–332. https://doi.org/10.3102/00346543062003307

Ponte DN, Cullen TA (2013). Considerations for integrating technology in developing communities in Latin America. Tech Trends 57(6): 73–80. https://doi.org/10.1007/s11528-013-0704-6.

Prensky M (2014). The world needs a new curriculum: It's time to lose the "proxies" and go beyond "21st century skills"—and get all students in the world to the real core of education. Educ. Technol. 54(4): 3–15. https://marcprensky.com/wp-content/uploads/2013/05/Prensky-5-The-World_Needs_a_New_Curriculum.pdf

Sadaf A, Newby TJ, Ertmer PA (2012). Exploring pre-service teachers' beliefs about using Web 2.0 technologies in K-12 classroom. Comput. Educ. 59(3): 937-945.

Saxena A (2017). Issues and impediments faced by Canadian teachers while integrating ICT in pedagogical practice. Turkish Online J. Educ. Technol. 16(2): 58–70. http://files.eric.ed.gov/fulltext/EJ1137791.pdf

Schunk DH (1995). Self-efficacy and education and instruction. In J. E. Maddux (Ed.), Self-efficacy, adaptation, and adjustment: Theory, research, and application. pp. 281–303. Plenum Press.

Siddiq F, Scherer R (2016). The relation between teachers' emphasis on the development of students' digital information and communication skills and computer self-efficacy: The moderating roles of age and gender. Large-Scale Assessments in Educ. 4(1): Article 17. https://doi.org/10.1186/s40536-016-0032-4

Tschannen-Moran M, Hoy AW, Hoy WK (1998). Teacher efficacy: Its meaning and measure. Rev. Educ. Res. 68(2): 202–248. https://doi.org/10.3102/00346543068002202.

VanderNoor JM (2014). Impact of technology on teacher efficacy and instruction time (Publication No. 3610754) [Doctoral dissertation, California State University, Fresno]. ProQuest Dissertations and Theses Global.

Venkatesh V, Rabah J, Fusaro M, Couture A, Varela W, Alexander K (2016).

Factors impacting university instructors' and students' perceptions of course effectiveness and technology integration in the age of Web 2.0. McGill Journal of Education/Revue des sciences de l'éducation de McGill, 51(1): 533–561. https://doi.org/10.7202/1037358ar

Wilson SD (2018). Leading edge online classroom education: Incorporating best practices beyond technology. Am. J. Bus. Educ. 11(3): 41–48. https://doi.org/10.19030/ajbe.v11i3.10187.

Xia BS (2017). An in-depth analysis of teaching themes and the quality of teaching in higher education: Evidence from the programming education environments. Int. J. Teach. Learn. High. Educ. 29(2): 245–254. http://files.eric.ed.gov/fulltext/EJ1146146.pdf

Yerdelen S, Osmanoglu A, Tas Y (2019). The influence of a teaching practice course with video-case enriched microteaching on prospective teachers' self-efficacy for teaching. Int. J. Res. Educ. Sci. 5(2): 560–573. http://files.eric.ed.gov/fulltext/EJ1215583.pdf.