



Status and Trends in University Admissions *For Women in Nigeria*

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ABSTRACT. Teaching and learning in Technical and Vocational Education and Training (TVET) colleges globally is being transformed by the integration and implementation of technology. However, in South Africa, a range of factors can contribute to and affect the usage of technology in TVET colleges, which includes lecturers' perceptions. This study investigated the perceptions of TVET engineering lecturers regarding the use of technology tools in teaching and learning. A qualitative research approach was applied that employed an interpretative paradigm. Twenty engineering lecturers from TVET colleges were interviewed to probe their perceptions regarding the application of technology tools in teaching and learning and to find out how lecturers apply technology-assisted methods in their classes. The findings indicated a positive belief in the application of technology tools for effective teaching and learning. However, emphasis was on the inadequate technology skills and knowledge that impact negatively on TVET engineering lecturers, exposing their inability to teach their students to use technology tools in their learning. The TVET colleges' management needs to organize training for engineering lecturers so that they can acquire relevant technology skills and knowledge to enable them to integrate technology into their classroom practices. It is recommended that management equip lecturers by arranging technology training workshops to ensure that engineering lecturers stay abreast with the latest advanced technology tools and machines for the practical training of engineers.

INTRODUCTION

Lecturers' can transform the teaching and learning environment by being the key drivers in the application of technology in Technical and Vocational and Education Training (TVET) Colleges (Nawaz, Awan, and Ahmad 2011). However, TVET engineering lecturers need a positive perception and innovation when applying technology tools in their teaching and learning environment (Tondeur et al. 2017; Gürfidan and Koç 2016). Lecturers' perceptions toward technology use in the classroom could affect their teaching positively or negatively (Rana 2012). TVET engineering lecturers are generally unable to apply technological tools because they lack the necessary technology skills, professional development training, and technology resources. Consequently, lecturers lack confidence and a positive perception toward technology devices in the classroom in front of their students, who are often more comfortable with technology (Mou 2016).

They therefore resist change in their classrooms and are likely to adopt traditional teaching methods because they perceive technology application as valueless (Johnson et al. 2016).

According to Straub (2009), for TVET engineering lecturers to sustain the implementation of technology devices for teaching and learning, certain personal elements need to be addressed, such as their perceptions, knowledge, skills, and willingness to use technology. The individual contextual factors are influential and must be considered at all times. It is imperative that TVET engineering lecturers adopt technology to enhance teaching and learning by promoting a student-centered approach to encourage students to be active life-long learners that can think critically and interact with their peers (Medová, Bulková, and Čeretková 2019).

The application of technology in TVET classrooms could be affected positively or negatively by numerous elements, like TVET engineering lecturers' experiences and perceptions and their students' performances (Johnson et al. 2016). Perceptions toward the various technology tools in teaching and learning processes are influenced by factors such as demographic characteristics, computer training, technology facilities (Gürfidan and Koç 2016; Khlaif 2018), recognition, and understanding of technology tools, and technology anxiety (Mukti 2000). The lecturers' use of technology further depends on their acquired technology training and knowledge (Mikre 2011).

Teo (2011) revealed that 592 Turkish lecturers applied technology in their classroom practice because of ease of use and positive perceptions. Sadik's (2006) study also mentioned the positive perceptions of TVET engineering lecturers in Egypt; computer training sessions and the availability of technology resources encouraged them to apply technology for teaching and learning. This was taken to detect whether positive perceptions, computer training, technology

facilities, technology resources, and demographic characteristics are imperative in the application of technology tools in classroom practice.

BACKGROUND

For education to be optimally promoted, a range of issues must be considered. Several aspects influence the application and implementation of technology for teaching and learning (Khlaif 2018), such as how to make teaching and learning fun and simple for the students to understand the engineering content. Additionally, the TVET engineering lecturers can apply technology tools in subjects such as information technology and engineering. However, the successful application of these technology tools largely depends on positive perceptions of TVET engineering lecturers (White and Martin 2012; Ertmer et al. 2012). Furthermore, Ertmer (2005) postulates that TVET engineering lecturers' decisions to apply technology tools are determined by their pre-existing positive perceptions toward technology application.

Akbaba (2013) and Blackwell, Lauricella, and Wartella (2014) stated that there is a correlation between positive attitudes of TVET engineering lecturers and the application of technology in the classroom. However, the research findings of Koc, Turam, and Okursoy (2016) argue that various factors negatively impact the application of technology by Turkish TVET lecturers, such as negative perceptions, lack of technological knowledge and skills to use advanced technology, lack of readiness to transform, and poor technical support. Therefore, it is important that the arguments mentioned above be addressed so that TVET engineering lectures can be encouraged to apply technology because their negativity can affect students' academic performances.

It has also been highlighted that engineering lecturers with prior technology experience have an advantage regarding the acquisition of relevant technology skills and knowledge when using technology tools (Kahveci, Şahin, and Genç 2011). Rana (2012) concurs with these researchers, indicating that TVET engineering lecturers believe that if they have sufficient computer experience, their perceptions could be positively influenced toward applying technology tools for the improvement of students' performances. When lecturers are exposed to technology, they gain valuable experience; as such, they could be encouraged and have positive attitudes when applying technology in their classroom. In this research, most of the TVET engineering lecturers lack technology experience and relevant technology skills that could assist in their classrooms. Unfortunately, these lecturers are not exposed to the application of technology tools due to a lack of resources.

In addition, in Buabeng-Andoh's (2012) study, which was conducted in Hong Kong and Singapore on the role of professional development, leadership, and support in lecturers' views and approach, it was found that positive support from the management of TVET colleges toward the use of technology devices

motivated and encouraged TVET engineering lecturers' perceptions of technology use for learning. Management support toward the application of technology tools for teaching and learning is pivotal for the development of TVET engineering lecturers to encourage the lecturers to use technology more and to teach their students how to apply technology in their learning.

Furthermore, Mukminin et al. (2019) state that the successful application of technology can happen when there is sufficient support and sufficient training of lecturers regarding technology use. Once that has happened, engineering lecturers will be positively motivated and encouraged to use technology tools in their classroom practices.

Aldahdouh, Nokelainen, and Korhonen (2020) indicated that lecturers in Finland have the intention to use numerous technology tools because they have the required technology knowledge and skills to apply innovations. Hence, management support and professional development technology trainings are significant to empower the TVET engineering lecturers and to provide them with the required technology skills and knowledge.

Positive perceptions improve TVET engineering lecturers' self-confidence and ease to effectively apply technology tools in their classroom without hesitation and shyness in front of their students, who may have more technology experience. Several research studies have mentioned that lecturers' positive perceptions promoted self-confidence in the application of technology tools, such as computers, tablets, and technology software programs (Khlaif 2018). Furthermore, Daniela et al.'s (2018) study, which investigated various countries, revealed that the lecturers from Latvia, Pakistan, Greece, and Poland lacked management support from their institutions. The management was not up-to-date with new technology applications, and there was no provision of effective and relevant support regarding the application of various technology tools to their lecturers and students.

Ramnarain and Hlatswayo (2018) supported the finding that TVET engineering lecturers' positive perceptions are essential in the application and implementation of technology devices in the engineering classroom. Lecturers' negative perceptions add to a lack of confidence, anxiety, and fear of failure when teaching students. When a TVET engineering lecturer lacks self-confidence, they will be challenged and stressed; therefore, the technology tools may not be used or will be applied less. Lecturers will not see any value in applying technology due to their negative perceptions.

According to Vongkulluksn, Xie, and Bowman (2018), male engineering students have more positive perceptions about their digital skills compared to female engineering students, who have been found to be less skilled in technology applications. Papadakis (2018) and Wozney, Venkatesh, and Abrami (2006) support the argument that male engineering students are more encouraged in the use of technology devices when compared to female engineering students who are less involved in the use of technology in the classroom. The above-

mentioned claims are relevant in this context since the TVET engineering faculty is male-dominated.

Van Braak, Tondeur, and Valcke (2004) indicated that numerous factors have a direct positive effect on the application of technology, such as positive attitudes, computer training, gender, and advanced technology, while age and computer experience have negative effects on the usage of technology tools. Papadakis (2018) and Wozney, Venkatesh, and Abrami (2006) stated that young male lecturers applied more technology in their teaching and learning than their female counterparts. Inan and Lowther (2010) agreed that the positive impact of technology on the students' learning was dependent on TVET engineering lecturers' readiness when employing technology for teaching.

Sarfo et al. (2011) elaborated, stating that contextual situations were contributing factors and could negatively or positively impact the perceptions of female and male students toward the use of technology tools. Furthermore, findings of the Organisation for Economic Cooperation and Development (OECD 2007) revealed that there was a generational divide in perception toward the application of technology tools in teaching and learning between the older people (lecturers) and the youth (students). Also, older TVET engineering lecturers were not encouraged to apply technology in their teaching because technology application was not significant to them.

It has further been detected that there is a difference in the perception of students from rural and urban areas (Mathevula and Uwizeyimana 2014). For example, compared to students in rural areas, students in urban areas have the advantage of accessing technology facilities and are able to use available technology resources without any challenge. As such, due to exposure to technology the urban students may have gain a positive perception, technology skills, and knowledge. The reason being that the students had the opportunity of using technology prior to studying at the TVET colleges compared to the rural students.

Furthermore, Mathevula and Uwizeyimana (2014) stated that South African TVET colleges need to raise the standard of technology implementation so that students could be employable in the fourth industrial world. Therefore, sufficient technology resources and infrastructure must be available and accessible for teaching and learning to engender a positive perception in TVET engineering lecturers to use technology devices in the classroom (Kay and Lauricella 2011). Currently, TVET colleges in South Africa lack the relevant technology resources and infrastructure that are required for integrating technology in teaching and learning. Moreover, everything is now done through technology. For example, teaching and learning are often completed online, and all relevant technology resources and infrastructure must be made available for usage by the TVET engineering lecturers and students.

The findings of Usluel, Aşkar, and Baş (2008) revealed that 814 Turkish TVET lecturers had a positive perception toward technology tools and resources,

such as the internet, computers, and data-projectors, which were provided in the laboratories, classrooms, and offices, due to their ease of use for teaching. Khlaif (2018) mentioned that the availability of technology resources, such as the internet and wifi, encouraged a positive attitude in the Palestine TVET engineering lecturers toward the application of technology tools, such as mobile phones and tablets, in the classroom.

Nevertheless, negative attitudes can impede technology use in the classroom (Sadaf, Newby, and Ertmer 2012). Mikre's (2011) study supported the above claim and indicated that the Ethiopian TVET lecturers were negatively challenged in regard to a lack of resources and infrastructures, such as poor Information Communication and Technology (ICT) networks and a shortage of computers.

The researchers believe that when lecturers' perceptions are negative—even if there is access to technology resources and appropriate infrastructure—the application of technology tools will be less. It is evident that the benefits and challenges when applying technology tools in engineering classrooms vary. The current study was conducted to respond to the following research question: how do the perceptions of TVET college engineering lecturers contribute to the application of technology in the classroom? The next section will discuss the theoretical framework that is the foundation of this article.

THEORETICAL FRAMEWORK

This study was grounded in the theory of the Technology Acceptance Model (TAM). This theory outlines important elements of effective technology implementation and application. Davis (1989, 139) originally addresses this theory, arguing that an individual's behavioral intention to use a system is determined by "two specific variables, perceived usefulness and perceived ease of use." In 1996 TAM I was introduced, and it investigated the importance of using technology software (Venkatesh and Davis 1996). TAM I was modified by developing TAM II in 2000 (Venkatesh and Davis 2000; Venkatesh 2000). Venkatesh and Bala (2008) proposed the latest work on TAM III. The theory emphasizes that one's behavioral intention to apply a system could be determined by system attributes, such as perceived enjoyment or pleasure and attitudes toward the system.

Since the inception of TAM, the focus has been on the implementation of computer-based technology. Venkatesh et al. (2003) extended TAM and formulated the Unified Theory of Acceptance and Use of Technology (UTAUT). This theory is the combination of eight prominent theories that are employed to envisage user acceptance behavior. Venkatesh, Thong, and Xu (2012) broadened the theory to UTAUT 2, which focuses on the acceptance and use of mobile internet technology by TVET engineering lecturers in the classrooms. In this study, the behavioral intention of the TVET engineering lecturers to apply the

technology tools, such as mobile phones and iPads, is determined by the positive attitudes that enable the perceived usefulness and ease of use.

Recent studies by Wei et al. (2016) and Ahmed and Kabir (2018) addressed the applications of UTAUT and UTAUT 2 and mobile internet technology acceptance in the education field, especially in higher education. The above-mentioned studies indicated that the intention to use mobile phones by the Bangladesh lecturers and Nigerian lecturers was determined by the performance, effort expectancy, and social influence (Wei et al. 2016; Ahmed and Kabir 2018). This investigation was implemented due to the advancement of the technology acceptance framework that impacted the current tendency of technology acceptance research in numerous fields. Therefore, several variables were identified in TAM by previous works, such as perceived usefulness, perceived ease of use, perceived enjoyment, attitude, and intention to use.

Perceived Usefulness

According to Davis (1989), perceived usefulness is defined as the amount to which a person believes and trusts that a specific system would improve performance. The perceived usefulness variable has been used to indicate the influence on attitude toward use and intention (Natalia, Bianca, and Pradipta 2019). In this article, the implication is that the perceived usefulness of technology tools led engineering lecturers to have positive perceptions toward applying and using technology continuously in their teaching and learning; therefore, innovation was applied to technology tools when teaching engineering activities.

Perceived Ease of Use

Davis, Bagozzi, and Warshaw (1989) clarified that perceived ease of use is the amount to which a person is certain that applying a specific system would be free from struggle. In addition, a recent study by Alalwan et al. (2018) assessed perceived ease of use from three angles: how the implementation can be understandable, easy to learn, and easy to use. It is also applicable in some of the TVET colleges, whereby the engineering lecturers apply the technology tools and technology software with ease for teaching and learning; the engineering lecturers end up improving when learning how to use the technology tools without any doubt and strife.

Perceived Enjoyment

According to Venkatesh (2000), perceived enjoyment is defined according to the amount of use of the specific system and the way an individual enjoyed its use and any outcome performances. Perceived enjoyment is defined as the perception

of enjoying technology such as computers beside their performance when used (Davis, Bagozzi, and Warshaw 1992). Other researchers' views showed that perceived enjoyment is an intrinsic element that motivates engineering lecturers to engage with something fun and exciting (Hussain, Mkpojiogu, and Yusof 2016). According to other previous studies, technology tools can provide the TVET engineering lecturers with enjoyment, fun, and excitement (Alalwan et al. 2018; Hussain, Mkpojiogu, and Yusof 2016). In the context of the study, apart from the performance of the technology tools, the amount of technology tool application, such as tablets, mobile phones, and social media, by the engineering lecturers was determined by their encouragement, positive attitude, enjoyment, and fun.

Attitude

Wilkinson and Schilt (2008) refer to attitude toward technology as the way individuals feel, ponder, or react to technology and how it changes with time. It therefore relates to whether engineering lecturers display a positive or negative disposition toward integrating technology in their classroom practices (Rana 2012). Thus, attitude is one of the contributing elements that influence engineering lecturers' behavioral intention to use technology tools. It also determines the extent to which lecturers consider the potential of technology tools to make engineering lessons fun and stimulating (Teo 2010; Venkatesh et al. 2003). In this article, most of the TVET engineering lecturer's perceptions are positive toward technology use.

Intention to Use

Intention to use is described as the user's behavior to apply technology constantly (Agustini 2014). Furthermore, Lu and Yang (2014) define intention to use as a tendency for a person influenced by attitude levels. Therefore, the TVET engineering lecturer's intention to use technology tools would positively influence the user's actual system usage. It became easier for some engineering lecturers who are exposed to technology resources to apply technology tools due to their behavioral intention to always use technology in teaching and learning.

RESEARCH DESIGN AND METHODOLOGY

A research design is a plan to organize and create the research to be attainable (Cohen, Manion, and Morrison 2018). This study adopted a qualitative approach that provided the researcher access to engage with the participants and to share their meaningful everyday life experiences.

Sampling and Size

One of the sample techniques used in qualitative research is the non-probability sample, so purposive sampling is used to focus on the precise research concerns (Cohen, Manion, and Morrison 2018). Participants were purposively sampled and were comprised of twenty-five experienced TVET engineering lecturers from four TVET colleges in the Gauteng province of South Africa. The TVET lecturers taught a variety of engineering subjects, such as civil engineering (n = 5), mechanical engineering (n = 5), electrical engineering (n = 5), computer engineering (n = 5), and graphic design (n = 5).

Data Collection and Data Analyses

Focus group interviews were arranged and conducted to explore the perceptions of the TVET engineering lecturers with regard to technology application in their teaching and learning. The interviews lasted between thirty to forty-five minutes so that all participants were able to provide answers to all research questions. The participants' responses were recorded using an audio recorder, mobile phones, and notes in a journal. Data were analyzed and grouped into themes.

Ethical Considerations

Ethical clearance and permission to conduct the study in the selected TVET colleges were obtained from the Research Ethics Committee (REC) from the University, Department of Higher Education, and TVET Colleges, where data was collected before the study commenced. The participants were provided relevant information, such as the title and objective of the study, and the consent forms that they had to sign. The anonymity of the participants was kept private and confidential (Creswell and Guetterman 2019).

FINDINGS

When the respondents were requested to share their views regarding their perceptions about employing technology tools, the following themes were identified and categorized. The exact responses of the respondents are quoted.

Insufficient Technological Knowledge and Skills

Participants in some TVET colleges mentioned that they supported the use of technology in teaching and learning. However, they were unable to apply technology at the TVET colleges because of various challenges that they encountered. The respondents indicated that they still lacked the relevant technology skills and knowledge to teach students how to use technology tools in

their learning. The respondents mentioned that they had never attended any technology training to equip themselves on how to apply technology. The following comments were noted:

I believe lecturers need to acquire technology skills and knowledge required in their teaching and learning. We lack relevant technology skills and knowledge on how to apply technology tools in the classrooms.

I believe that we should be trained and be exposed to technology application so as to improve teaching and learning. However, we are not acquainted with the application of technology so as to transfer the appropriate technology skills.

Lack of Technology Resources and Infrastructure

The participants mentioned that another contributing factor was the lack of technology resources at the colleges, with participants resorting to traditional teaching methods. The following utterance was noted:

Unfortunately, it is challenging for us as lecturers to apply technology tools in our classroom practices because most of the colleges are lacking technology infrastructure, technology resources, and advanced technology machines for theory and practical lessons. We, as lecturers, end up using the traditional teaching method.

Management Involvement in the Use of Technology

The TVET engineering lecturers indicated that they believed in the use of technology tools in their classroom practices. They expressed a strong belief that management must take a leading role in the use of the technology tools for teaching and learning. Management needs to be abreast with the latest advanced technology tools and machines used by other TVET colleges globally. However, it was uncovered that management from other TVET colleges was not showing interest nor providing any support toward the application of technology. The following utterances were noted:

Our management is not concerned at all with regard to the application of technology in our teaching and learning. Currently, management is not aware of the latest advanced technology used in the classroom. It is imperative for management to be aware of the latest technology tools as we are in the fourth industrial era.

I believe that management participation in the use of technology is important so that they can know the importance of technology for teaching and learning.

Although some of the TVET management did not show any support and interest toward the use of technology for teaching and learning, other participants from another college stated that they were pleased with their management's involvement related to the use of technology tools in their classrooms. The following statement was mentioned:

The management is providing the support that we need as lecturers so that we are able to use technology for teaching and learning and improve our student's performance.

We have been assured that we will be issued with new technology devices such as the laptops, tablets, and data projectors for teaching. We can rely on the management when it comes to technology.

Professional Development

Participants from other TVET colleges showed a positive outlook regarding technology application in teaching and learning. Some of the respondents highlighted the importance of professional development because they attended advanced technology trainings that provided them with technology skills and knowledge that were relevant to the TVET environment. The engineering lecturers had been trained how to use the software programs and online technology applications for teaching and learning. The following responses were noted:

The advanced technology development trainings that we have attended empowered us as lecturers at our college so that we can be able to employ technology tools in the classrooms.

The technology training programs that we attend assist us as lecturers because we are now able to use various technology tools such as mobile phones, tablets, and technology platforms, such as WhatsApp and YouTube, for teaching and learning.

DISCUSSION

Insufficient Technological Knowledge and Skills

The TVET engineering lecturers' perceptions relating to the application of technology tools in their classroom practices revealed confidence in the use of technology for teaching and learning. However, the findings emphasized that the inadequate technology skills and knowledge negatively impacted the use of technology tools by the TVET engineering lecturers, inhibiting them from teaching their students to use technology tools in their learning.

These findings are congruent with the study by Tugba, Aykut, and Okursoy (2016), who stated that the Turkish TVET lecturers are unable to apply the technology tools in their classrooms due to factors such as a lack of technology knowledge and skills to use advanced technology, negative attitudes, and other elements. Mou's (2016) research is in support of the study finding, revealing that there are possible challenges and barriers that negatively impact perceptions from the Bangladesh TVET lecturers when applying technology tools in the classrooms, such as the lack of relevant technology skills and knowledge.

However, Aldahdouh, Nokelainen, and Korhonen's (2020) study is inconsistent with the findings of the current study and states that lecturers in Finland are well empowered with the appropriate technology skills and knowledge. Their study findings indicated that lecturers, in general, could apply various technology tools with innovation and ease to teach their students how to apply technology tools in their learning, such as LMS, social media platforms, mobile phones, laptops, and others.

In the context of this study, the TVET engineering lecturers wished to use technology tools, and their perceptions and attitudes were positive toward technology because they think that the application of technology can enhance the quality of teaching and learning. However, respondents were challenged because they could not apply these tools due to a lack of knowledge and skills. This means that even if the TVET lecturers had the technology resources and facilities, it would still be challenging for them to use technology tools.

According to the theoretical framework of the study—the Theory of Acceptance Model (TAM)—when the TVET engineering lecturers experience insufficient technological knowledge and skills, it will lead to them having difficulties perceiving any ease of use and usefulness.

In addition, negative perceptions toward technology use are a hindrance (Rana 2012), as attitude is one of the contributing elements that influences engineering lecturers to apply technology tools. Ultimately, the engineering lecturers will lack the intention of applying technology to improve the quality of education (Davis 1989).

If these TVET engineering lecturers were exposed to technology application and relevant technology trainings, their teaching and learning could be productive and improve the students' academic performance. Lecturers would be in a better position to gain the appropriate technology knowledge and skills to teach the engineering content while integrating technology devices. As such, TVET engineering lecturers would be encouraged and have positive perceptions toward technology use in their classrooms.

Lack of Technology Resources and Infrastructure

Although most of the respondents had a positive perception toward the application of technology tools at the TVET colleges, some were concerned that the TVET colleges lack technology resources and infrastructure. Their perceptions are negatively impacted, as they resort to traditional teaching methods that limit the active participation of their students in their learning. This finding is consistent with Mikre's (2011) study, which indicated that the Ethiopian TVET lecturers were negatively challenged with regard to lack of resources and infrastructures. Lecturers are encountering poor conditions of ICT infrastructures, poor ICT networks, and a shortage of computers, making the

situation challenging for the lecturers to apply technology tools effectively. In addition, this finding is in alignment with Tedla (2012), who stated that South American TVET lecturers are unable to apply the technology devices in their classrooms due to a lack of technology resources and infrastructure. Khlaif's (2018) study supported the findings and the above-mentioned studies by mentioning that the unavailability of technology resources and infrastructure are a barrier as they do not encourage a positive perception in the Palestine TVET engineering lecturers toward the application of technology tools.

In the context of this study, TVET engineering lecturers in other colleges were not integrating technology in the theory and practical lessons due to a lack of resources. Instead, lecturers were using the traditional teaching method and used whiteboards. In other classes, teaching aids, such as the overhead projectors, were not used.

When the technology resources are lacking, this implies that it becomes challenging for the engineering lecturers to learn or know how to apply technology tools with ease. The lack of resources can make the engineering lecturers perceive technology as not useful and incline them not to use technology because of their attitudes (Li 2014). The lecturers will never experience the fun and enjoyment of applying technology in teaching and learning, as indicated in the TAM theory of this study (Hussain, Mkpojiogu, and Yusof 2016).

Management Involvement

The findings indicated the importance of TVET college management taking a leading role in the application of technology. Engineering lecturers' responses in some of the TVET colleges indicated a lack of management support in applying technology devices in their teaching. Likewise, the study by Daniela et al. (2018) agreed, stating that the lecturers from Latvia, Pakistan, Greece, and Poland lacked management support from their institutions. In the context of this study, the management was not abreast with technology application, and the institutions did not provide effective and relevant support regarding the application of various technology tools to their lecturers and students. Management had negative perceptions toward technology, which led to them not encouraging lecturers to use technology. Hence, it was challenging for the lecturers to apply technology in their classrooms.

Although the TVET engineering lectures had a desire to apply technology tools to improve the engineering content, the management did not take a leading role in the application of technology tools. The management was not up-to-date with the advanced technology tools employed at other TVET colleges globally. Unfortunately, the management negatively impacted the participants because they were not exposed to the integration of technology tools in their classrooms.

This all implies that if the TVET engineering lecturers do not receive the necessary support needed for the implementation and application of technology tools from the TVET management, they will have negative perceptions toward

technology use. Therefore, the engineering lecturers will never experience the use of the TAM theory, as they will not have any intentions of using technology in their classrooms, and they will never experience the ease of use and usefulness when applying technology tools (Alalwan et al. 2018).

If engineering lecturers can be provided with the necessary support from the management, it would be easier for them to be exposed to the latest technology. Moreover, technology is pivotal, as we are living in the fourth industrial era, where almost everything includes the application of technology. For example, online teaching and learning involve a variety of technology platforms and software, such as laptops, tablets, phones, Microsoft teams, and Zoom.

Findings further revealed that other TVET engineering lecturers from other colleges responded cheerfully that their management provides enough support with regard to the use of technology tools at their colleges. It was also indicated that institutions are better placed when their management is knowledgeable about the latest technology applied at TVET colleges globally. The study performed by Buabeng-Andoh (2012) in Hong Kong and Singapore concurs with this finding because it emphasizes the importance of leadership and support in lecturers' perceptions. The study discovered that positive support from TVET college management toward the use of technology devices motivated and encouraged engineering TVET lecturers to apply technology tools for teaching and learning.

In the context of the study, the respondents that mentioned that their management provides them with the necessary support to apply technology tools in their teaching explained that the management acted in that way because the TVET college has a technology policy in place, which is being implemented by the management to support the application of technology for both the lecturers and students. The respondents were provided with relevant technology devices as indicated in their technology policy.

The respondents have the opportunity to experience the ease of use of technology, and they are able to perceive the usefulness of the technology tools. During the observation, it was clear that the TVET engineering lecturers intended to employ technology in their classrooms because their perceptions were positive toward the use of technology due to management involvement.

Professional Development

The findings pointed out that other TVET engineering lecturers had the opportunity to attend the professional development technology trainings courses and obtain relevant technology knowledge and skills. Fortunately, the lecturers gained appropriate technology experience to apply various devices for teaching and learning. The management adhered to the technology policy that stated that the lecturers need to be exposed to appropriate trainings so that they can acquire the relevant technology skills and knowledge. Also, the professional development assisted the lecturers in gaining positive perceptions and self-confidence. Therefore, lecturers were not doubtful when applying the technology devices in

front of their technologically-savvy students. Khlaif (2018) concurs by indicating that positive perceptions improve TVET engineering lecturers' self-confidence and ease to effectively apply technology tools in their classroom without hesitation. Buabeng-Andoh's (2012) study discovered that positive support from TVET college management toward the use of technology devices inspired the TVET engineering lecturers' perceptions to use technology tools for learning.

As mentioned in the discussion of the TAM theory, attitude toward technology determines the extent to which lecturers consider the technology tools as fun and stimulating for engineering lessons (Venkatesh et al. 2003). The findings revealed that professional development trainings assisted and encouraged participants to use the technology tools more often and make their lessons fun.

During the observation, the researcher was able to confirm what the participants mentioned regarding the attendance of technology training. TVET lecturers gained relevant technology knowledge and skills when using technology tools, such as tablets and mobile phones, for teaching and learning. Lecturers showed positive perceptions toward the implementation and application of technology tools. In addition, the engineering lecturers applied the TAM theory since they had the intention of using technology devices and the knowledge of how the implementation of technology can be understandable, easy to learn, and easy to use when teaching (Alalwan et al. 2018).

RECOMMENDATIONS

The study exposed numerous challenges regarding the application of technology tools by the TVET engineering lecturers in their classrooms. However, those challenges could be addressed through the collaboration of all the stakeholders so that teaching and learning can be enhanced by the use of technology. As a result, the following recommendations are suggested:

- The management of TVET colleges need to be aware of educational technology that is used by other TVET colleges.
- Management needs to provide support to their engineering lecturers by arranging professional development technology trainings so that the lecturers
- are equipped with technological knowledge and pedagogy skills to enable them to apply technology tools with confidence and skill.

Limitations of the Study

The limitation of the study is that the viewpoints of TVET college managements on the application of technology-assisted methods in teaching and learning were not investigated. Management never had the opportunity to share their perceptions regarding the use of technology at the colleges. The current study findings can be added up with different views from the management.

CONCLUSION

Positive perceptions are significant in the use of technology tools by the TVET engineering lectures in teaching and learning. Management involvement regarding the use of technology tools is pivotal because engineering lecturers will obtain the necessary support when using technology. Although engineering lecturers encountered various challenges, such as a lack of technology resources, facilities, technology skills, and knowledge to apply technology, the continuous attendance of appropriate technology trainings by the TVET engineering lecturers assisted in providing relevant technology skills and knowledge when teaching the engineering content so that the student's performance can be improved.

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