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## The Status of Teaching with Digital Devices: The Case of Pre-Service Performing Arts Teachers of St. Ambrose College of Education in Ghana

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### ABSTRACT

This study examines how teaching and learning of Performing Arts incorporate digital devices in lesson preparation, lesson delivery, and reflection at the pre-tertiary level. Using a case study, the research examines how Performing Arts pre-service teachers of St. Ambrose College of Education who are on attachment (teaching practice) use technology to support and enhance teaching and learning. Respondents sampled from the population were observed while they taught in the classroom and interviewed. Findings indicate that the use and choice of digital devices is dependent on action learning and adult learning principles and incorporating digital devices in instruction enhances teaching. However, both conclusions are dependent on the accessibility and availability of digital devices to both teachers and learners. Consequently, the lack of access to and availability of digital devices negatively impacts the use of digital devices and vice versa. This study recommends that teachers are exposed to practical application of Information and Communication Technology (ICT) during their time at the College of Education and that stakeholders ensure that teachers and learners have access to digital devices.

### INTRODUCTION

Digital devices have had a major influence on the Ghanaian education sector and it is an integral part of 21st-century education goals. Currently, the curriculum for Colleges of Education has an Information and Communications Technology (ICT) component which equips learners with skills that will enhance their ICT proficiency. The COVID-19 pandemic solidified the importance of digital devices in all aspects of the economy including education. The pandemic also stressed the need to incorporate digital devices in teaching and learning. Schools were physically closed down during the period, however, a number of them continued teaching and learning via online learning platforms. The shift from face-to-face learning to online learning was beneficial during the lockdown period. It should be noted that some institutions are still using a blended approach even after the easing of in-person learning restrictions. The blended approach involves a mix of face-to-face and online teaching approaches (Pape, 2010). Inferring from the above occurrence, there is a difference in having knowledge of ICT and using ICT. Acquiring skills in word processing and spreadsheet software is not beneficial unless those skills are applied to enhance teaching and learning. This difference is what caused some schools to halt their activities during the pandemic while others continued teaching and learning. The National Teacher Education Curriculum Framework (NTECF) (2018) also comments on the need for teacher trainees to be knowledgeable in ICT and practically use ICT to enhance general and specialized teaching.

### Statement of the Problem

The current curriculum for Colleges of Education (CoE) acknowledges the importance of ICT in teaching and learning. Therefore all programmes, comprising Early Childhood Education, Primary Education and Junior High School Education have ICT courses as a requirement. The rationale for this directive, according to NTECF (2018) is the realization that the constructive use of ICT greatly enhances teaching and learning.

How does knowledge of the internet and the computer parts translate into constructive use of ICT for a generalist (Early Childhood and Primary Education) pre-service teacher and a specialized (Junior High School) pre-service teacher?

### Research Questions

1. What digital devices are used by pre-service Performing Arts teachers in and out of their classrooms?
2. How do pre-service Performing Arts teachers incorporate digital devices in teaching?
3. How does the use of digital devices affect teaching of the Performing Arts?

### Significance of the Study

This study suggests best practices and tools that enhance the practical application and use of digital devices in teaching performance arts. These findings allow pre-service teachers to implement 21st-century teaching strategies and reflect on how effective or ineffective these teaching methodologies are in the field.

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This study examines how fourth-year Performing Arts pre-service teachers of St. Ambrose College of Education, Dormaa-Akwamu use digital devices in teaching. The researcher chose this group (final-year students) because they have already gone through the required ICT course taken at the College of Education and are better placed to evaluate the merits or demerits of the course. Secondly, the final-year group is engaged in on-campus and off-campus teaching which exposes them to the National Pre-tertiary Curriculum Framework and this also makes this group better placed to evaluate how effective they will be in primary or junior high classrooms with regards to using digital devices constructively. This study addresses issues concerning digital devices in the Performing Arts because the research is interested in ways to effectively teach Performing Arts in the 21st century classroom and add to the existing knowledge in the field.

## LITERATURE REVIEW

### Digital Devices

Digital devices, according to Haning (2016), is a term used interchangeably with technological devices and comprises devices such as laptops, tablet computers and smartphones. However, McGarr and McDonagh (2019) state that technologies that are described as digital devices will continue to widen as more devices are invented. The notion that the range of products described as digital devices continues to widen with the development of new software or hardware validates the synonymous use of the terms electronic and computerized devices in place of digital devices (Eyman, 2015). Currently, digital devices are not reserved for a group of people but are available to all, so much so that its use has brought transformation in work, studying, communicating, accessing information and leisure time (Ala-Mukta, 2011). Ilomäki, Kantosalo and Lakkala (2011) add that changes in society and culture based on the existing and the development of new digital devices have influenced skill requirements for using digital devices.

### Performing Arts

According to Nantwi, Afful and Asare-Ababio (2019), the Creative Arts are divided into two major components, namely Visual Arts and Performing Arts. Nantwi *et al.* (2019) add that the Creative Arts expose learners to creative processes such as singing, playing an instrument, drawing, carving, acting, dancing, composition and appreciation through participation. These creative processes fall, either under Visual Arts (drawing, carving, painting) or Performing Arts (singing, acting, dancing, playing an instrument). The term Performing Arts, according to McCarthy (2001), comprises theatre, music, opera and dance and also includes live and recorded performances of these subdivisions. This definition implies that a Performing Arts teacher should have mastery over content in music, theatre, opera, dance and performance traditions for each of these. The National Council for Curriculum and Assessment (NaCCA, 2019)

indicates that subject areas under the Performing Arts should comprise music, dance and drama. Therefore, Performing Art pre-service teachers are exposed to these subject areas (music, dance, and drama) in the Colleges of Education so that they are ready for the classroom after graduation. The Performing Arts teacher is described as a facilitator or coach who engages learners with practical pedagogies and assessments (NaCCA, 2019). According to De Villiers and Sauls (2017), narrative teaching styles in teaching music, dance and drama do not foster creativity and active learner participation. As such, the contemporary curriculum, according to Eady and Lockyer (2013) is designed to guide teachers in the development of flexible and adaptable learners who can take on new skills and situations quickly and easily. Thus, making teaching and learning practical is important because the more learners practice the more learning is improved (Nantwi *et al.*, 2019) This implies that for effective teaching of concepts in the Performing Arts, teachers should design instruction such that learners are practically engaged during learning and evaluation of learning. NaCCA (2019) adds that the teaching and assessment of practical skills could include projects, case studies and creative practical tasks. Nantwi *et al.* (2019) support this by asserting that apart from using the appropriate teaching and learning materials, the Creative Arts which include the Performing Arts should be practical-oriented.

The training of Ghanaian teachers in general, for that matter Performing Arts teachers according to Buabeng *et al.* (2020), is the main focus for the formation of Colleges of Education. Students from the Colleges of Education are described as pre-service teachers, prospective teachers or pre-service teachers (Buabeng *et al.*, 2020). Prospective teachers including Performing Arts pre-service teachers according to Buabeng *et al.* (2020), have the following enrollment options; generalist teachers trained to teach at the elementary level (B.Ed Primary Education), early childhood teachers (B.Ed Early Childhood) and specialist teachers (B.Ed JHS Education).

### Theoretical Underpinning

#### Andragogy (Adult Learning)

Andragogy (Adult Learning) theory was developed in the organisational development field to provide new employees with tools and competencies relevant to their new workplace (Kenner & Weierman, 2011). This theory, according to Kenner and Weierman (2011), was developed to supplement higher education models that did not prepare prospective employees fully for the workplace. Kenner and Wiernerman (2011) add that the theory is based on the characteristics of the adult learner. These characteristics comprise the following;

- a. Adult learners are self-directed (responsible for their actions)
- b. Adult learners draw lessons from their rich life experiences
- c. Adult learners are self-motivated (ready to learn)
- d. Adult learners have goals and they persevere to

achieve those goals.

Pre-service teachers at St. Ambrose College of Education (SACE) (higher education learners) have similar characteristics hence the use of this theory in this study is relevant. The educational implications of this theory according to Kenner and Wienerman (2011), is a curriculum design that is in direct relation to current teaching and learning practices since adult learners better appreciate classroom concepts that are related to workplace experiences. Kenner and Wienerman (2011) add that concepts and learning tools should relate to real-life workplace (teaching and learning) experiences and be adaptable to meet individual needs and styles.

### Action Learning

Action learning according to Marquardt and Waddill (2004), comprises learners solving problems in real time and simultaneously learning through questioning and reflection. Marquardt and Waddill (2004), add that when learners (pre-service teachers) encounter real, relevant and current problems they can develop problem-solving skills and transfer these skills to their workplaces (classroom). The theory is similar to concepts propounded in the Creative Arts (Performing Arts) curriculum which is the need to make teaching and learning practical so that learners develop problem-solving and critical thinking skills (NaCCA, 2019; NaCCA, 2020).

### Teaching with Technology

Teaching, according to Lund, Furberg, Bakken and Engelen (2014), is gradually changing into a practice that has a complex learning environment that models, produces, and innovates educational activities and develops its assessment criteria and practices. Pettersson (2018), adds that teachers must have the skill to transform educational traditions because digital technology has become central to everyday work. Lund *et al* (2014) agree that technology is indeed transforming teaching and learning but point to the fact that there are challenges and constraints in blending technology with the traditional education setup so it becomes critical for teachers to develop professional-specific skills that allow efficient use of digital devices in the classroom.

Integrative competence according to Lund *et al* (2014), allows teachers to evaluate how teaching and learning are affected by technology and how a technology-rich classroom should be managed for effective teaching and learning. So that the teacher becomes a model inspiring the learner to positively contribute and responsibly participate in the digital environment (NPECF, 2018). This can only be achieved when teachers become creative in their approach to the use of technology. Koehler and Mishra (2009), state that although the Microsoft Office suite was designed for the business environment it can be used in education. Similarly, the internet and its supported technologies were designed for entertainment, communication and social networking, however, these are useful in enhancing instruction (Koehler & Mishra,

2009). Lund *et al* (2014), add that for effective classroom management there should be guidelines for activities and assignments, guidelines describing productive and unproductive use of technology and guidelines indicating which classroom activities are supported and not supported by technology. Therefore teachers should, according to the NPECF (2018), create experiences that will allow learners to use technology efficiently and safely. In addition to this, teachers and pre-service teachers should understand how and when to use technology in the classroom and assess how effective the use of technology is concerning achieving learning objectives (NTCEF, 2018). As mentioned in Mensah, et. al 2023, the incorporation of technology has been a significant asset in the process of teaching and learning. Yet the use of ICT in some subjects, it is still limited in the Ghanaian Classrooms (Mensah, et. al, 2023).

### Digital Devices in Performing Arts Education

According to Eady and Lockyer (2013), technology has always been a part of the teaching and learning environment, especially in the resources that teachers use to enhance student learning. Digitally competent Performing Arts teachers, according to NaCCA (2019), can incorporate technology in the classroom to enhance deep and independent learning. Eady and Lockyer (2013) assert that the reason for the use of technology in education is to prepare students for roles in society and to keep pace with society. The technology used in the classroom comprises tools that teachers use to help their students use, create, manipulate, communicate and collaborate (Eady & Lockyer, 2013). The internet (a tool), for instance, according to De Villiers and Sauls (2017), allows teachers to search for characters and performances that enhance their knowledge in the subject area. According to De Villiers and Sauls (2017), technological devices most frequently used in the performing art classroom comprise; smartphones, speakers, laptops and interactive whiteboards. These devices present teachers with varied learner engagement opportunities so that teaching and learning activities are varied or changed when necessary. Technology (smartphones, speakers, laptops) in the classroom should increase the consistency and quality of the teaching and learning process (NaCCA, 2019). Therefore in designing learning experiences, teachers must consider the appropriate use of technologies (Eady & Lockyer, 2013). So digitally competent teachers might, according to Eady and Lockyer (2013), use digital learning resources which combine multimedia elements (text, images, audio and video) in presenting information. These multimedia elements (text, images, audio and video) according to De Villiers and Sauls (2017) are familiar to learners hence there is a keen interest in exploring technologies with these elements which arouse interest in learners. Worksheets on music, dance and drama could also be sourced from the internet, according to De Villiers and Sauls (2017), to supplement content in workbooks. Teachers may also

consider using digital resources for introducing a topic, as part of a demonstration or teacher lecture, to stimulate class discussions, engage students in activities that are not possible in the classrooms and allow students to work at their own pace (Eady & Lockyer, 2013). Teachers, according to De Villiers and Sauls (2017), most often used their smartphones and laptops to play music and video clips that were based on the content of the Performing Arts curriculum. Hence, these multimedia devices can be used to support concepts that were taught because they present learners with concrete examples and ideas. Live concerts are essential in teaching the Performing Arts, however, costs incurred in making reservations can be supplemented according to De Villiers and Sauls (2017), through the use of YouTube videos and CD recordings. Video technology, according to De Villiers and Sauls (2017), is used to record performances (music, dance and drama) allowing teachers to assess students fairly (without being rushed) especially when they are fatigued. Teachers can critique recorded performances during their free periods and provide feedback that is beneficial to the development of the learner.

## METHODOLOGY

### Study Type and Research Design

This study uses qualitative research which according to Merriam and Tisdell (2015) is concerned with understanding how people interpret their experiences, how these experiences influence their environment and what meanings are attached to these experiences. This research is a case study and as such, according to Merriam and Tisdell (2015), it provides a detailed description and analysis of a bounded case (there are limitations on type of respondents, number of people to be interviewed and what is to be observed). In using this approach, the researcher interacts with people affected directly by what is being investigated. This study reports on events concerned with the use of digital devices in teaching Performing Arts and then draws conclusions based on the findings.

### Sample

The sample for this study is 10 Performing Art pre-service teachers in the fourth year. The sampling techniques adopted to select the sample were purposive and simple random. Purposive sampling according to Creswell and Creswell (2017), provides this study with participants who are relevant to the problem being investigated. Purposive sampling was fundamental because the Performing Arts final-year students were the population of interest to provide the requisite information needed for the research work. A simple random sampling technique was also used to select 10 candidates from the total of 35 pre-service teachers who would be observed during lessons and interviewed face-to-face.

### Research Instruments

Observation and semi-structured interviews were used to collect data from participants during field

visits. Pre-service teachers were observed teaching in their classrooms while in teaching practice. During observations the following aspects were considered: digital devices present in the classroom, digital devices used during instructions and how these devices were incorporated into lessons. Digital devices found in the classroom were captured under the digital devices present in the classroom section. This provided data on the types of devices found in pre-tertiary classrooms and also ascertain whether these devices are provided by the institution or acquired personally. The section titled 'Digital Devices Used during Instruction' provided data on digital devices that are used by pre-service teachers in the classroom. Under how devices are incorporated into lessons, observation provided data on how digital devices were used to support teaching. This provided data on pedagogical styles that pre-service teachers have adopted to support and improve their instruction.

Apart from the observation, semi-structured interviews were conducted. These interviews were divided into two sections namely; Comments on benefits derived from ICT courses at SACE and Comments on incorporating technology in instruction during teaching practice.

Views and comments on the perceived benefits of ICT courses at SACE were collected from pre-service teachers under the first section. This included what ICT courses were offered, comments and views on teaching methodologies for those courses and learning strategies implemented by pre-service teachers studying those courses. Teaching and learning resources that were available to pre-service teachers during these courses were also be captured.

The second section collected views and comments on incorporating technology in instruction. Data included how pre-service teachers were incorporating technology in lesson preparation, teaching and lesson reflections. Data collected here were limited to teaching practice experiences.

### Data Collection Procedure

Participants were informed about the nature of the research and the roles they are to play in the research. This was to reduce performance anxiety and uneasiness during observation sessions. Interviews were face-to-face and conducted when participants were free so that they will be comfortable and not pressed for time. Details from observation and interviews as well as scheduled participant meetings were recorded in a field notebook.

## RESULTS AND DISCUSSION

In this section, data collected from the field via participant observations and face-to-face interviews are discussed, highlighting aspects that were general for all respondents and aspects that were unique and respondent-specific.

### Background Information of Participants

Participants engaged learners during the Creative Arts period and were mentored by Creative Arts teachers.

The Creative Arts, according to NaCCA (2019) and NaCCA (2020) of Ghana, comprises two strands; Visual Arts and Performing Arts. Respondents of this study were more versed in one strand (Performing Arts) than the other (Visual Arts). One of the pre-service teachers mentioned that he had to do a lot of research in the area of Visual Art rather than Performing Art when planning lessons since that was not a part of the courses he had studied from the first year till date. Although the current curriculum combines Performing Arts and Visual Arts as Creative Arts, courses concerned with preparing pre-service teachers to teach Creative Arts in the colleges of education do not mirror provisions made in the curriculum. All respondents had been taken through the compulsory college-based ICT and Information Literacy courses. The ICT course according to three of the respondents (pre-service teachers) was concerned with introducing students to the parts of a computer and the grouping of those parts into input and output devices. There was also an Information Literacy course which according to other respondents focused on avoiding plagiarism and using the college's library but none of these things are related to what they have to do in the practical teaching. However, the skills I am employing currently in accessing information via WhatsApp or YouTube are skills I developed through the use of social media (Kwabena, personal communication, March 20, 2023). Respondents admitted that they could use the internet but did not know that there were repositories (e-libraries) and online teaching resources that could help in developing schemes of work and assessment ideas for teaching Creative Arts. Apart from WhatsApp, YouTube and Google, I do not know any sites or e-resources for Creative Arts.

### **Learning Environment and Classroom Organization**

Schools visited during fieldwork did not have designated spaces, such as piano laboratories, dance studios and art galleries for Creative Arts sessions. However, Creative Arts lessons that were taught by respondents took place in their respective classrooms. So respondents assigned to the lower and upper primary levels (generalist teachers) had specific classes to teach and respondents assigned to junior high students (subject teachers) changed classes depending on the timetable.

Classrooms visited during participant observations were not equipped with screens or projectors for displaying videos and images. In addition to this, there were also no devices provided by the school for playing audio (for example speakers and amplifiers). However, there were some educational artworks and posters displayed on the walls of the classroom. These graphic displays (drawings of primary and secondary colour wheels, pictures of fruits, numbers charts and drawings of clocks) were encountered more in the lower and upper primary classrooms than in classrooms of junior high students.

Schools of the respondents did not have a wireless local area network (WLAN). However, participants were able

to access the internet via their cellular network (personal mobile phones). This restricted the incorporation of internet-based research activities during teaching and learning so that students are not able to do personal research using the internet. However, respondents use their cellular data (mobile phone internet) to access audio recordings, video recordings and images that are relevant to the subject matter to enhance their understanding of the content being taught.

The mobile (smart) phone was the device of choice for participants without laptops when there was the need to play audio recordings. Only two out of the ten respondents interviewed and observed owned laptops. Also, the mobile phone allowed participants to display pictures during class. To compensate for its small display screen, participants took phones around so that learners could view whatever was being displayed. However, participants with personal computers (laptops) had larger display screens and higher speaker outputs, so there was no need to move. Participants who owned bluetooth speakers (four out of ten participants) were very comfortable playing audio material because the device's sound output was higher than that of a mobile phone and was suitable for a large class size.

Technological devices used in the classroom during the field study were not procured by school management. However, all technological devices that were used in teaching and learning were procured and owned by respondents. Although requests were made for these devices, mentors of participants and school management mentioned that devices would be procured pending financial approval.

### **Using Technology in Lesson Preparation**

In planning lessons, which comprise both teaching and learning activities, respondents used the Creative Arts curriculum and its prescribed scheme of work as a guide. Copies of both the curriculum and scheme of work were accessed in numerous ways. There were physical copies that were procured from mentors of respondents. All respondents who had access to physical copies could take these copies home; however, respondents were able to make copies by taking picture images using mobile phones and scanning these documents with applications from mobile phones. These copies allowed respondents to prepare for lessons that were going to be taught.

Social media (WhatsApp and Telegram) greatly enhanced lesson preparations by respondents. Useful documents concerning the subject area were shared on these platforms so that respondents on these platforms could use them when needed. According to one of the respondents, he would usually go onto their WhatsApp group page to ask for documents that will improve his lesson during his lesson planning sessions. Some images, audio and videos that would enhance lessons were made available to respondents via social media platforms. There were some dance videos posted on our WhatsApp platform so he downloaded them and added a few to his lesson plan.

The internet was also mentioned as vital in lesson preparation by participants of this study. It was used to search for definitions, appropriate pronunciation and correct spelling of keywords. Another respondent mentioned that she usually goes online to check for meanings of words or demonstrations of certain concepts in music or drama so that she can give more examples and explanations to the students. Other respondents in this study used the internet to search for audio material that would serve as teaching and learning resources (TLRs) during teaching and learning. According to a respondent, if he needed need to play a song (audio recording) in class, he had to go online to search for the song using the title. The internet supports the use of social media platforms so that without an internet connection respondents could not access WhatsApp and Telegram platforms.

### Teaching with Technology

Respondents used technology to enhance their interactions with learners in the classroom. During the introduction of topics, for instance, respondents used media devices to enhance critical thinking skills. After showing images of personalities wearing diverse costumes during second lesson, pupils were able to actively participate in discussing what costume is and the importance of costumes but that did not happen during first lesson because no images were shown. The students sometimes did not understand what the teacher was talking about because it was a new thing but when the images and the videos that have been downloaded were shown to them, they appreciated the concepts been explained better. A respondent mentioned that, because of his use of technological equipments in teaching, his students are always excited when class starts. They are always looking forward to listening to audio recordings via his bluetooth speaker, especially during his lesson starters.

Videos of traditional dances and live music performances were used in exemplar sections of the lesson outline of respondents. According to a respondent, after taking examples of traditional dances from students, he played a video recording of the Kete dance and asked questions concerning the performance later. This practice develops observation skills in students which according to NaCCA (2019) and NaCCA (2020) is essential to the Creative Arts curriculum. From their observations, the students of the respondent were able to differentiate between costumes worn by Kete performers and Takai performers. This confirms the statement made by NaCCA (2019a) that teachers are to encourage a learner-centred culture in their classroom lessons.

Technological devices were used by respondents to complement and supplement teaching and learning resources. The school does not have musical instruments, even a keyboard but after viewing the videos in class, students were able to identify instruments that were strange to them at first. NaCCA (2019b) provides a teacher resource pack that includes a collection of multimedia tools (videos, pictures, audio) that may be

used as teaching and learning resources for each lesson. A respondent indicated that, before he used any video or picture for a lesson, he consulted the resource pack for the best options but now he also considers the students in deciding what works best.

All the respondents noticed an increase in active class participation and enthusiasm whenever technology is incorporated into lesson delivery. A respondent indicated that, his students always ask if he would make use of technology in their subsequent lessons. As a class teacher (B2), he observed that because of his use of technology, his pupils are very active during Creative Arts lessons. Although respondents noted an increase in class participation and enthusiasm from learners during the use of technology, managing the classroom was challenging. Participant observations conducted during the field study showed fairly poor class management during Creative Arts sessions.

### Incorporating Digital Devices into Teaching

Respondents used digital technologies as a teaching and learning resource (TLR) to either gather information on topics or enhance teaching methods. According to some respondents indicated that, they usually went online to check for meanings of words or demonstrations of certain concepts in music or drama to prepare for a lesson. This is corroborated by De Villiers and Sauls (2017), who also found that the internet (as a tool), for instance, allows teachers to search for characters and performances that enhance their knowledge in the subject area. Displaying images and video (multimedia) during instruction allows new concepts to be reduced to the level of understanding of learners. According to a respondent, in teaching, students sometimes do not understand what he is talking about because it is a new thing but when he shows them the images and the videos he has downloaded, they appreciate the concepts he explained better. Easy & Lockyer (2013), similarly stated that digital resources are used for introducing a topic, as part of a demonstration or teacher lecture, to stimulate class discussions, engage students in activities that are not possible in the classrooms and allow students to work at their own pace.

Apart from using digital devices in lesson preparation and lesson delivery respondents did not use digital devices in assessment. However, using digital devices in assessments allow teachers to have more time to analyze data collected from assessments and also vary assessment strategies to suit the needs of each student (Koehler and Mishra, 2009; Eady and Lockyer, 2013; De Villiers and Sauls, 2017 and Lurrillard, 2008). Respondents did not use digital assessment strategies because they were not aware of such strategies and were faced with availability and accessibility issues concerning digital devices.

### The Effects of Using Digital Devices in the Teaching of Performing Arts

Findings from the study indicate that technology

influences teaching positively. However, the extent of influence is dependant on the abilities of the teacher. All respondents were able to motivate learners by introducing multimedia in their lesson delivery. However, video and audio presentations were more engaging than pictorial presentations. According to a respondent, before he used any video or picture for a lesson, he consulted the resource pack for the best options but now he also considers the students in deciding what work best. In considering the learner and the topic, respondents can present concepts that engage learners and allow learners to achieve learning goals. Keengwe, Onchwari and Onchwari (2009) and Kurshan (2009) support the claim that using technology increases the efficiency and personalization of learning, however the misuse of technology reduces the efficiency and personalization of learning.

### CONCLUSION

Colleges of Education need to produce competent educators who can adapt to new technological models. However, there is a mismatch between the digital skills that pre-service teachers are taught and the digital skills that are required at the pre-tertiary level. This study aims to investigate ways to bridge the gap in digital competence. It provides answers for the standard skill requirements for each component of digital competence, and explores the impact of digital competence on teaching and learning. These insights shed light on the importance of digital competence in education.

The study involved pre-service teachers who specialized in Performing Arts but were also required to teach Creative Arts, including Visual Arts. Prior to their lessons, the respondents conducted online research on Visual Arts topics. The study found that the teachers felt more confident presenting topics in Performing Arts than in Visual Arts, despite having researched both subjects on the web. The study also showed that having a better understanding of smartphone capabilities and a positive attitude towards digital devices are correlated with successful incorporation of technology into teaching. Again, the study revealed that practical problems helped the respondents to develop their problem-solving and critical thinking skills, which are highly beneficial for adult and action learning. Interestingly, the respondents did not use these strategies while they were in school, but they acquired them during their teaching practice, which offered them realistic workplace experience.

Finally, the study identified poor internet connectivity, expensive subscription fees, and lack of WLANs in schools as challenges for students to access the internet, hindering their exploratory learning, action learning, and learner-centred pedagogy.

### Future Research

Although this study focused on a case at St. Ambrose College of Education (SACE), research should be done in other colleges of education in the country. Results

from these studies could be juxtaposed with results from this study to ascertain whether the case only pertains to SACE or cuts across.

Performing Arts pre-service teachers were the focus of this study; however, the research could be carried out in other disciplines such as Science, Mathematics, Religious and Moral Education (RME) and Home Economics etc. Results from such research could confirm similarities or otherwise in the use of digital devices in teaching. Research on the availability and accessibility of digital devices in pre-tertiary institutions and their relation to achieving 21st century educational goals could also be carried out.

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