# Examining the Impact and Cognition of Technology on Preservice Teachers of English in Swaziland

By Patrick M. Mthethwa

## ABSTRACT

This study examined the impact and cognition of technology on preservice teachers of English in Swaziland, where English is taught as a second language (ESL). Colleges and universities in Swaziland embarked on an initiative to equip preservice teachers with technology skills. However, despite that every preservice teacher who graduates from either a university or college must complete a module in technology, it has not been established if preservice teachers perceive technology as useful, and if they are prepared to integrate it into their future teaching experiences. One hundred and thirty-five ESL preservice teachers participated in this study. They completed a 20-item questionnaire that was later analyzed using quantitative methods. Subsequently, follow-up interviews were conducted with 23 participants. Overall, the results revealed that while preservice teachers had positive perceptions of the usefulness of technology in language teaching, they were less likely to integrate technology into their language teaching experiences.

*Keywords: Technology, English as a second language, computer-assisted language learning, preservice teachers.*

## INTRODUCTION

Teachers of English as a second language, whether new or old, in the teaching profession would often agree that educational technology has infiltrated educational settings throughout elementary, primary schools, high schools, colleges, and universities. As a result, it is common to find different types of technology in schools, colleges, and universities around the globe; their curricula are continuously modified to accommodate changes advanced by educational technology. The introduction of technology in educational institutions has been realized in various forms, such as the introduction of information and communication technology (ICT). ICT in schools and institutions of higher learning is often inspired by a widespread and technocentric belief about the transformative nature of technologies (Watson, 2006). This belief nurtures the notion that technology changes the way we perceive realities in the 21st century, such as the way we teach and students learn. Thus, to a large extent, technology is seen as a "golden key" for facilitating technology-enhanced and student-centered teaching environments (Hannafin & Land, 1997).

Putting students at the center of teaching has become the hallmark for constructivist's theories. Essentially, there are many benefits of integrating technology with language instruction. A number of research studies such as Blake (2000); Brett (1997); Fin & Inman (2004) confirm that using technology in language teaching does benefit learners' educational outcome and their overall language proficiency. Also, learners' exposure to technology introduces them to a variety of online materials that are useful for authentic learning; these authentic learning materials are important to buttress instruction at any level of education. For instance, the use of multimedia, the Internet, and educational computer applications is associated with learners' motivation and autonomy (Armstrong & Yetter-Vassot, 1994; Blake, 2000; Brett, 1997; Pusack & Otto, 1990).

Motivation and autonomy are essential components of a desired student's learning behavior, synonymous with success in the language classroom. Each of these components keeps a student focused and goal oriented. However, not every researcher agrees that technology improves students' language proficiency, some studies report the contrary. For instance, authors such as Lasagabaster and Sierra (2003) and Stepp-Greany (2002) reported negative results about the adoption of technology to support language teaching. These studies, for instance, reported that no gains were found in

[1] The author is aware there are many types of technology tools. However, in this study, the author uses the word technology with reference to the use of computers in the classroom for educational purposes.

students' language proficiency when technology was used in the language classrooms. However, despite reported technology failures in some cases, technology has continuously gained popularity in many language-teaching contexts, including ESL.

In some ESL contexts, especially in developing countries, the popularity of technology has been a driving force for its adoption to support teaching. Because of limited educational resources, such as English language teaching materials in some ESL contexts, technology is used to buttress teaching and further alleviate the problem of insufficient teaching/learning materials. As a result, most ESL contexts prioritize the integration of technology with language teaching and, in some ESL cases, ICT is adopted to support instruction.

The success of integrating technology in ESL classrooms, however, depends on many factors, such as the availability of resources, teachers' dispositions about technology, technical support, and (to a certain extent) showing teachers how to implement technology in the classrooms. These factors are some of the determinants of whether or not the integration of technology in the ESL classroom will be successful. That said, teachers' positive cognition of technology is a centerpiece for guarantying the possibility of integrating technology with language instruction. If language teachers, for instance, raise serious concerns about technology, it is not a good sign that they will use technology in their language-teaching experiences. Liu, Theodore, and Lavelle (2004) noted that teachers' concerns about technology negatively affect the adoption and the integration of technology into teaching. Therefore, positive cognition of technology is a cornerstone for its successful integration into the classrooms, and the reverse is true.

## ICT Initiative in Swaziland

Because of the belief that technology has capabilities of improving instruction in ESL, educational institutions in Swaziland embarked on an initiative to improve teaching by using technology. As a result, the Ministry of Education took major initiatives to introduce technology to support instruction in schools, colleges, and universities. These initiatives have been realized in many forms. For instance, UNESCO, the Swaziland Computer Education Trust (CET), and the Open Society Initiative for Southern Africa (OSISA) donated computers to schools, with the aim of improving education and overall instruction in Swaziland. CET installed 20 computers in 40 schools and provided technical support for each school (Ministry of Education Report, 2008). These computers have been used to support both teaching and learning in the recipient schools. Recently, an initiative by the Ministry of Education to integrate technology to support instruction has been the focus of current educational policies and strategic plans. Essentially, the strategic plans require institutions of higher learning to restructure their curriculum to accommodate technology. Thus, in teacher education colleges, the Ministry of Education built computer laboratories and installed over 40 computers in each college's computer laboratory as a way of implementing the strategic plan, and these computer laboratories are used as ICT centers. Every student who enrolls in the teacher colleges is expected to take ICT as a component of this program of study (Ministry of Education Report, 2008). The rationale behind encouraging every college student to take ICT modules is to ensure preservice teachers are computer literate and can integrate technology into their future teaching experiences. The major challenge though is whether or not preservice teachers in Swaziland share the same vision with the Ministry of Education, regarding the objectives of the ICT initiative.

## The Status of English in Swaziland

English is a second language in Swaziland. It is used as both an official language and medium of instruction in schools. The status of English in Swaziland makes teaching it a huge task because there is a lot expected from teachers of English. Precisely, English-language teachers are viewed as the "heart" of the entire education system. The use of this metaphor describes the situation at its best. Like in the body, when the heart fails, all the other organs become dysfunctional. In Swaziland's case, the heart is English language and the other organs are the other subjects, such as geography, science, math, literature, and science, to name but a few. Thus, teachers of English have a task for scaling up the

learning of English, by equipping students with language skills essential for upscale performance across the entire curriculum. For instance, in a geography class it is expected that a student should distinguish a question that requires him/her to describe, from one that requires him/her to discuss. For each question, the student should know the relevant intellectual skills involved, and these intellectual skills are grounded on analytical knowledge acquired from English-language classes. As a result, students who are proficient in English have greater chances of performing well across all the disciplines, and the reverse is true.

Overall, in Swaziland, English-language teachers are largely responsible for preparing students to perform well across all the disciplines and, on top of that, to ensure students are proficient in both spoken and written forms of English. However, there are challenges English- language teachers encounter in ensuring that this task is executed properly. The challenges range from insufficient teaching materials to lack of exposure to authentic cultural target language materials, usually available on the Internet. As a result, ESL teachers in Swaziland rely on textbooks that eventually deprive learners of the significance of authentic voices of the target language, which are provided by online educational videos. Therefore, when the Ministry of Education took the initiative to introduce technology in teacher colleges and universities, the idea was to ensure that preservice teachers access more materials to support teaching; it was also to orient learners to technology in schools. However, ever since technology was introduced in teacher colleges, it is not known if preservice teachers perceive technology as a useful tool for supporting instruction, albeit evidence that teachers' use and knowledge of technology are significantly related to their perceptions (Atkins & Vasu, 2000). The more at ease teachers are as they use technology, the more they develop positive perceptions of technology, leading to its integration with instruction (Lam, 2000).

## THEORETICAL FRAMEWORK

This study examined the impact and cognition of technology on preservice teachers of English in Swaziland, using existing theories of the adoption of technology. As stated in the previous paragraph, ever since the introduction of ICT in teacher colleges in Swaziland, little is known about the impact of technology, preservice teachers' perceptions of technology, and its integration into language teaching. Also, it is not known how critical decisions that evolve around pedagogy, policy, and the curriculum are influenced by research findings. The lens through which this study investigated the phenomena is the diffusion of innovations theory.

The diffusion of innovations theory focuses on the process by which innovation is adopted and accepted by individuals or members of a community (Rogers, 2003). This theory represents a number of subtheories, such as the systems and change theory (Fullan, 2001) that were relevant for this study. The system and change theory advances the idea that schools are decentralized organizations, with systems embedded in it. The embedded systems are students, teachers, classrooms, and other subsystems, whose primary function is to ensure that the schools deliver essential services to students, realizing goals and mission statements. The study therefore adopted this theory to investigate the overall phenomena, within which preservice teachers, ESL students, and the education system in Swaziland work together to realize educational goals, strategic plans, and mission statements. However, because the diffusion of innovations theory could not explain causation in this study, the grounded theory (Strauss & Corbin, 1990), mainly the constant comparative method was used to explain causation.

## RELATED LITERATURE

Beginning teachers often view the integration of technology with language teaching as a distractor that destabilizes the classroom routine, including norms and space (Somekh, 2008). These routines are subconsciously established by both the traditional way of teaching and, sometimes, by the mentoring teacher. Unfortunately, traditional ways of teaching do not provide spaces for technology because they are much older than the advent of technology, and teachers who are accustomed to the traditional ways of teaching often think of technology as a distractor (Williams et al., 2011). As a result, some teachers develop negative perceptions of technology due to the notion that technology is a distractor. Researchers in this area, such

as Yildirim (2000), attest that appropriately designed teachers' training programs are essential in shaping teachers' perceptions and cognition of technology. Also, some studies, such as Egbert, Paulus, and Nakamichi (2002); Lam (2000); Oh and French (2007) found that the results of a meticulously developed teachers' training program accounts for teachers' improved technology capabilities and increased levels of confidence, leading to the adoption of technology in language classrooms.

There are many factors, however, that affect preservice teachers' perceptions of technology and integrating it into their teaching practices. For instance, teachers' attitudes toward technology have a significant influence on the adoption of technology (Atkins & Vasu, 2000). As a result, perceptions and attitudes toward the use of technology have been studied from both sides, that is, from learners and teachers. From the side of learners, Torkzadeh, Pfughoeft, and Hill (1999) observed that perceptions and attitudes toward computers influence an individual's mind or frame of reference. Their study reported that learners' exposure to computers or computer-related devices at an early age influenced their perceptions and attitudes toward technology later. Conrad and Munro (2008) added that someone with a negative experience and low efficacy of technology may eventually form negative cognition about technology and, in a worse scenario, avoid thinking about or contact with technology.

From the teachers' side, researchers such as Kim (2002); Redmond, Albion, and Maroulis (2005) noted that critical factors affecting the successful integration of technology into the language classrooms were largely associated with teachers and not the learners. Thus, Kim (2002) contended that teachers' perceptions of technology could either inhibit or enhance its adoption. To a certain extent, whether teachers' perceptions of technology inhibits or enhances its adoption is a function of the teachers' background and orientation with technology. Redmond, Albion, and Maroulis (2005) noted that teachers' personal backgrounds are important factors in determining the adoption of technology. Several factors are essential in establishing positive cognition of technology and its adoption. For instance, studies such as those by Lee and Son (2006); Shin and Son (2007); Suh (2004); and Yildirim (2000) posited that factors such as availability of computer facilities, students' easy access to technology facilities, and teachers' prior experiences with ICT or similar programs are strongly related to either the success or failure of the adoption of technology.

In addition to the list of factors affecting teachers' cognition of technology suggested by the researchers in the previous paragraph, there are myriad other factors. These factors include large classes of students, insufficient or restricted work stations, slow-processing computers, frequent computer freezes, and lack of technical support, including peer support. These factors impact the success of the adoption of technology and compromise the teachers' positions regarding its integration with instruction. Also, teachers' previous exposure to any form of technology, such as ICT, determines their perceptions of technology (Egbert, Paulus, & Nakamichi, 2002). Teachers' previous exposure to technology may be a function of work experience, training, or curiosity about technology and its uses. For instance, Egbert, Paulus, and Nakamichi (2002) noted that teachers with previous technology experience are likely to integrate technology activities into their teaching.

Furthermore, Warschauer (2003) noted that technology tools such as computers are powerful tools to use in supporting students with low language proficiency. In other words, students benefit from using technology, both inside and outside the classroom. Inside the classroom, computers promote individualism and independence from a single source of information, whereas outside the classroom students use computers to access unlimited amount of educational resources (Blake, 2000; Kuang, 2000; Loucky, 2005). Therefore, technology provides invaluable benefits to students; it affords interactive, collaborative, and socially situated features on the Internet (Kramsch & Anderson, 1999; Mallette & Mthethwa, 2012). Armstrong, Yetter-Vassot (1994) and Blake (2000), for instance, reported that students' exposure to technology offsets limits set by geographical boundaries. From one point of view, Kramsch and Anderson (1999) reported how Messenger, Skype, and Second Life facilitated discussions across cultural boundaries. On the contrary, and despite these documented advantages of using technology in class, some studies such as Lasagabaster and

Sierra (2003) and Stepp-Greany (2002) reported failure in using technology for learning. For instance, these studies reported that technology did not improve the learners' knowledge dispositions. However, be that as it may, there is documented evidence that technology does benefit learners around the globe, in terms of opening new language-learning experiences (Blyth, 1999; Bradely & Lomicka, 2000). Also, technology bridges diversity in students' cultural backgrounds that is now a common feature in 21st century classrooms.

## TECHNOLOGY CHALLENGES IN AFRICA

The use of educational technology in Africa is not as vibrant as it is in developed countries. In developed countries, for instance, technology is used in many educational settings, for various purposes, ranging from registration for classes to actual teaching of specific content materials. In contrast, in developing countries such as Swaziland, the use of technology is still limited to basic skill development. That is, teachers use technology minimally, especially when it is used to access and retrieve online materials for supporting instruction. In some places though, such as South Africa, the use of technology (i.e., ICT) is thriving, and as a result, the role of technology is documented. For instance, Jaffer, Ng'ambi, and Czerniewicz, (2007) noted:

> ICTs can play a role in shaping curriculum design at the micro-level. ICTs open up new ways of accessing information thereby changing the relationships between students and between students and their teachers. Access to primary sources in the form of video, audio and photographs that may be contained in digital archives have the potential to influence the content of curricula because it makes previously inaccessible information available. In addition, ICTs enable lecturers to transform their teaching practices by facilitating student-student discussion and collaboration or by simulating 'real-world' problems thus providing students with authentic learning experiences. (p. 6)

In Swaziland, however, there are still many challenges facing the use of technology. These challenges range from lack of infrastructure to lack of qualified personnel who are knowledgeable in merging technology with the curriculum to support content area instruction. Also, some students come from diverse cultures and underprivileged backgrounds. As a result, some students come to schools, colleges, and universities with technology phobia or even stereotypes, some of which are detrimental in learning environments. A majority of students, for instance, start using technology when they come to educational settings such as schools, colleges, and universities. Otherwise, before they come to these institutions, some know little about using technology, especially computers. That problem notwithstanding, and as noted before, attempts have been made by the Ministry of Education to provide opportunities for computer literacy to all college and university students. Thus, the introduction of technology to colleges and universities, especially with regard to preservice teachers, is to realize this goal and also to ensure that the use of technology is extended to all classrooms, from primary to high schools.

### The Present Study

As observed by Atkins and Vasu (2000), teachers' cognition of technology is an important determinant of the integration of technology with instruction. For this reason, first, this study investigated if there were similarities between preservice teachers' perceptions of the usefulness of technology and using technology for language teaching. Second, the study investigated if there was a relationship between preservice teachers' perceptions of the usefulness of technology and using technology in their future teaching experiences. Third, the study investigated if there was an interaction by age and year of study on how preservice teachers perceived integrating technology with language teaching. Lastly, the study investigated if preservice teachers were likely to use technology in their language teaching, and why. The fourth qualitative question actually came as a follow-up question, arising from the quantitative data analysis.

## METHODOLOGY

This study was a mixed method research design. It used both quantitative and qualitative modes of inquiry. This design was useful to understand the phenomena under study more broadly, than if one research paradigm (i.e., quantitative or qualitative) were used (Johnson & Christensen, 2012). For this study, the mixed

method research design was appropriate; it allowed complementary strengths between the quantitative and qualitative components (Creswell, 2003; Johnson & Christensen, 2012). As a result, combining these modes of inquiry expanded the breadth of this study. Overall, the study used identical samples for both the quantitative and qualitative inquiries. Data for this study was collected sequentially. That is, the quantitative data was collected first, and the qualitative data was then collected.

## Participants

This study surveyed 135 preservice teachers (n =135) from Space  Teachers' College (STC) in Swaziland. This included 73 females (54.1%) and 62 males (45.9%). They were between 20 and 39 years of age. Students who enroll at STC must complete high school, obtaining grades between A and D in primary teachable subjects such as English, math, home economics, sciences, and social studies. Because of a backlog of applications every year, students wait for several years before they are admitted to the college. Thus, the college rarely admits new graduates from high school, and this explains why there is large variability between the participants' ages in this study. The typical length for the program of study at STC is three years, after which the graduates are certified to teach in primary schools. Every student from first to the second year must enroll in academic communication skills (ACS), English language, and literature. Even though in the third year students specialize in different concentration areas such as languages, sciences, social studies, math, and applied sciences, they still must enroll ACS as a component of their study. As a result, during this study, all participants were enrolled in at least one of the English language courses.

## Instrument

The instrument used in this study was a 20-item questionnaire, which was developed for this study. In the questionnaire, three items asked participants' demographic information such as age, gender, and year of study, while 17 items asked construct-related information. The

Table 1. *Reliability Statistics*

| *Cronbach's alpha* | *Standardized* | *Number of Items* |
|---|---|---|
| .675 | .718 | 16 |

[2] Space is a pseudo name for the teachers' college where data was collected.

Table 2. *Scaled Items: Mean, Standard Deviation, and Total.*

| ***Scaled Items*** | ***M*** | ***S D*** | ***N*** |
|---|---|---|---|
| Technology makes language learning interesting | 4.20 | 0.83 | 20 |
| Technology motivates learners | 3.90 | 1.07 | 20 |
| Technology provides new learning experiences | 4.45 | 0.76 | 20 |
| Technology provides opportunities for language learning | 3.95 | 0.89 | 20 |
| I am familiar with Google documents | 3.70 | 1.34 | 20 |
| I am familiar with online dictionaries | 2.00 | 1.34 | 20 |
| I am familiar with PowerPoint | 3.15 | 1.50 | 20 |
| I am familiar with YouTube | 2.05 | 1.36 | 20 |
| I can use technology to download teaching material | 4.75 | 0.55 | 20 |
| I can use technology to keep students grades | 4.85 | 0.37 | 20 |
| I can use technology to prepare lessons | 3.35 | 1.09 | 20 |
| I can use technology to search material on the Internet | 4.30 | 0.98 | 20 |
| I will use technology to teach reading | 3.35 | 1.27 | 20 |
| I will use technology to teach grammar | 4.05 | 1.10 | 20 |
| I will use technology to teach speaking | 3.10 | 1.29 | 20 |
| I will use technology to teach vocabulary | 4.25 | 0.97 | 20 |

continuum on each item ranged from 1 to 5. One was the lowest score and five was the highest score. The rating was assumed to be interval with higher values indicating more endorsement of the statement. The values on the rating scale were based on an underlying continuum defined by the anchors and typically in a more ascending way, reflecting more of the property being rated as one goes higher on the scale (Gamst, Meyers, & Guarino, 2008).

Before the study was conducted, the instrument was tested on 20 preservice teachers, who did not become part of the study. Cronbach's alpha was conducted to estimate the internal consistency of the items. The coefficient alpha for the 17 items was 0.683. However, one item was removed from the instrument because it did not measure the intended construct. Therefore, 16 items remained, excluding items on demographic information. The remaining items' overall internal reliability increased to 0.718, which is acceptable for conducting research (Nunnally, 1994). Table 1 shows the reliability statistics, and Table 2 shows the mean, standard deviation, and total number of the norming participants.

### Data Analysis

Data were analyzed using quantitative methods. A sample *t*-test was conducted to establish if there were similarities between preservice teachers' perceptions of the usefulness of technology and using technology for language teaching. For the second analysis, Pearson *r* correlation coefficient was conducted to establish if there was a relationship between preservice teachers' perceptions of the usefulness of technology and using technology for language teaching. And lastly, the analysis of variances (ANOVA) was conducted to determine if there was an interaction by age and year of study on how preservice teachers perceived integrating technology with language teaching.

## RESULTS

Because the study was a sequential mixed method design and collected two sets of data, the results are presented in the same logic, starting with the quantitative portion and then the qualitative portion. However, later in the discussion section, the findings from both data analysis are triangulated and synthesized.

## QUANTITATIVE RESULTS

The results for the first research question revealed that there were no similarities but differences between preservice teachers' perceptions of the usefulness of technology and using technology for language teaching, and the differences were significant. Table 3 presents the results for the first research question.

As shown by Table 3, the mean for perceived usefulness of technology ($M = 48.11$, $SD = 7.92$) was significantly greater than the mean for potentially using technology for language teaching ($M = 36.43$, $SD = 6.70$, $t\,(134) = 16.97$, $p = .001$ (two-tailed). It should be noted that having significant differences between these variables in this study is an indication that teachers were less likely to use technology for language teaching, even though they thought highly of its usefulness. The second research question investigated if there was a correlation between preservice teachers' perceptions of the usefulness of technology and using technology in future language teaching. The results are presented below.

Table 3. *Usefulness and Potential Use of Technology for Instruction*

| *Category* | *N* | *M* | *SD* | *Min* | *Max.* | *t* | *Sig (2-tailed)* |
|---|---|---|---|---|---|---|---|
| Usefulness of technology in teaching | 135 | 48.11 | 7.92 | 28.00 | 48.11 | 16.97 | .000** |
| Potential use of technology in teaching | 135 | 36.43 | 6.70 | 15.00 | 36.43 | | |

***Note: * = significant at alpha < .025; ** = significant at alpha < .001***

As shown by Table 4, there was a positive correlation between participants' perceptions of the usefulness of technology and using technology for language teaching, $r$ (134) = 0.412, $p$ = .001. That is, as their perceptions of the usefulness of technology increases, the potential to use technology for language teaching also increases. The third research question investigated if there were interactions between age and year of study on how the preservice teachers perceived the usefulness of technology for language teaching. ANOVA was conducted to investigate if there were interactions between these variables. Prior to conducting the main analysis, Levine's test was performed to check for violations of the assumptions of homogeneity of variances, $F$ (5, 129) = 0. 560, $p$ = 0.73. Since Levine's test was insignificant, ANOVA was conducted with no concern for any violations. The results for research question three showed an interaction in year three (see Figure 1). However, the interaction was not significant, $F$ (1,129) = 1.44, $p$ = 0.23.

As shown by Figure 1, preservice teachers between 30-39 years in both first and second year had better perceptions of using technology in the ESL classroom compared to their counterparts whose ages were between 20-29 years. However, in third year, the reverse was true. That is, the third-year preservice teachers between 30-39 years fell below their counterparts of ages between 20-29 years. This sharp decline is indeed a cause for concern.

Table 4. *Correlation*

| *Paired Items* | *N* | *Correlation* | *Sig.* |
|---|---|---|---|
| Usefulness of technology versus its use for language teaching | 135 | .412 | .000** |

***Note: * = significant at alpha <.05; ** = significant at alpha < .001***

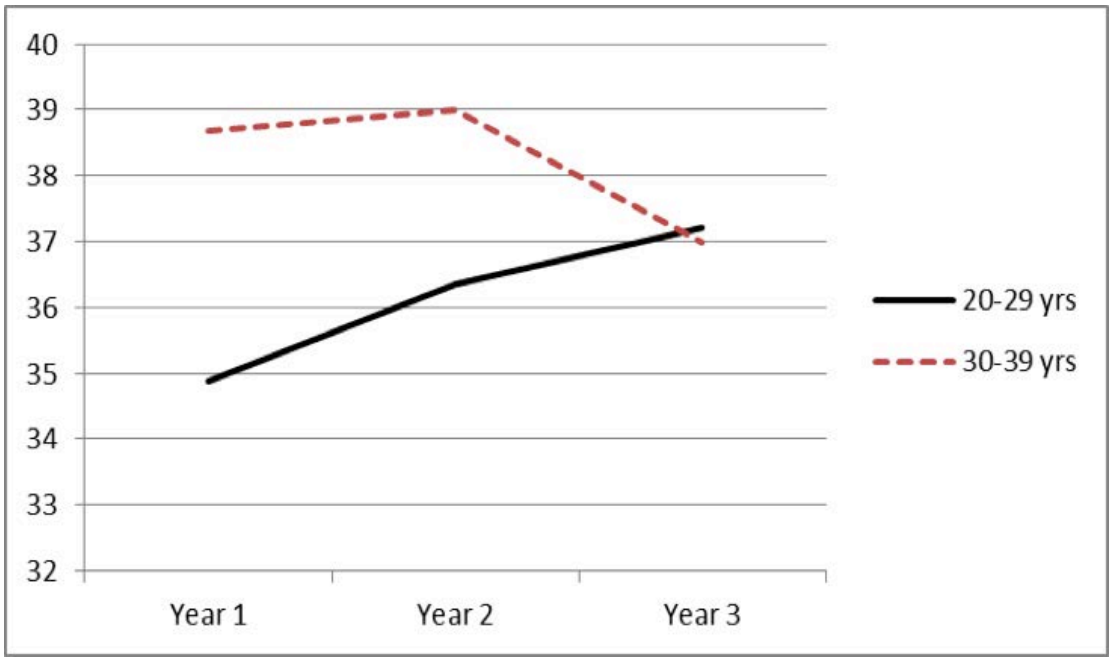


Figure 1. *Interaction between Year of Study and Age*

## QUALITATIVE RESULTS

The last research question investigated if the preservice teachers were likely to use technology to teach English in their schools, and why? This question came as a result of the quantitative data analysis, which showed that preservice teachers were less likely to use technology in language teaching. Therefore, follow-up interviews were conducted with 23 participants, who had taken part in the quantitative data collection. Data emanating from the qualitative question were analyzed using the constant comparative method. The overarching theme that emerged from the interviews was that participants were less likely to use technology to support language teaching, and the reasons they gave revolved around the following thematic categories: class size, practice time, Internet speed, and power outage.

### Class Size

Most of the participants noted that the ICT classes were large. For example, there were over 40 students in each ICT class, and there was only one instructor who helped them each time they encountered technical problems. Also, some participants highlighted that technical problems took a toll during their material learning time. As a result, they were not confident that they could use technology to teach. They emphasized that since most of them did not have background knowledge of using computers, they needed support from time to time during the ICT lessons. But because of the large number of students, they waited for a long time to get technical support from the instructor. In relation to the size of the classes, one participant stated:

> The classes are big, big, I mean big because now more students are admitted at STC. If I have a problem at my workstation, sometimes I wait for more than 3 minutes before the instructor can reach my workstation. Sometimes, as soon as he leaves, I encounter other problems, and it takes time for him to come back to me, and I understand, he has to help other students too.

Moreover, the participants also noted that each workstation, for instance, had about six students and most of them encountered technical problems. So, if they cannot help each other (peer support) to solve the problems, they all wait for the instructor to attend to them.

### Practice Time

Another reason the participants gave for being less likely to integrate technology into their teaching was that they don't have enough practice time, apart from class time. As a result, they do not get an opportunity to reinforce previously learned materials. For instance, during the day when the computer laboratory is open, they are in other classes. In the evening when they get time for practice, the computer laboratory is closed, and when they go to class the next day, they usually start a new topic. So, they do not get enough time for individual practice. When one participant was asked what major changes he would like to see concerning practice time, he said:

> I wish the computer laboratory could be open in the evenings and weekends because most of us live on campus. So, we can use the evenings and weekends for practice. This time may also be con venient for typing our assignments, other than writing them.

### Internet Speed

Another setback the participants mentioned was access to the Internet, which was sometimes very slow. They emphasized that the Internet was sometimes very slow even after connection. As a result, they wait for a long period of time to access web pages. They also noted that some of the computers in the ICT laboratory were not connected to the Internet, and it was difficult to learn how to use the Internet resources without a connection. One participant when asked if he was ready to use technology in teaching said:

> I don't think I am ready to use technology in my teaching. I don't want to embarrass myself in front of my students because students who come from privileged families know more about computers and how to use the Internet, than I think I do. Here (meaning at the college) we do very little on the Internet because it is slow. So, I think I will be embarrassed to be taught by my students how to search materials on the Internet.

### Power Outages

The last reason participants cited was power outages, especially in summer. They said sometimes thunder and lightning cause severe power outages, and once there is power outage, they cannot use computers. They noted that, sometimes, the power outage can last for several hours before it is fixed, especially if it is not only a problem of STC but of the entire neighborhood. During the absence of power, they do not engage in any technology related activities in class, apart from a regular lecture. As a result, they miss a lot of material during the times when there is no power, especially in summer.

## DISCUSSION AND CONCLUSION

Essentially, both quantitative and qualitative findings of this study revealed complementary results about preservice teachers' perceptions of technology and using technology to support language teaching. In fact, the qualitative portion illuminated the *why* question that arose from the quantitative analysis. For instance, the mean for preservice teachers' potential to use technology for language teaching was lower than that of their perceptions of its usefulness, suggesting preservice teachers were less likely to use technology to support language teaching. The reasons preservice teachers gave during the interviews when triangulated with the quantitative results complemented each other. Therefore, the challenges preservice teachers encountered were related to the low ratings on their potential use of technology in the language classrooms.

Overall, the results can be explained in terms of preservice teachers' low efficacy in using technology to teach ESL in comparison with the perceptions of its usefulness. The disparity between their perceptions of the usefulness of technology, together with the compromised intention to use it for language teaching is an epitome of a disconnection between the ICT program and its intended objective. As revealed by the qualitative section, the disparity is mainly caused by lack of confidence in using technology, arising from myriad challenges orchestrated by class size, practice time, Internet, and power outages that preservice teachers encounter, leading to low efficacy. For instance, the large number of students in the ICT classes tends to slow the frequency of technical support students receive, and this, in turn, lowers their confidence levels associated with using technology to support teaching. There is no doubt that teachers need a lot of technical support in technology (Selami, 2013), and that support builds teachers' confidence in merging technology with their teaching practices (Redmond, Albion, & Maroulis, 2005).

Also, it is worth noting that in this study each of the groups (i.e., year 1 through year 3) reflected a different perception pattern with regard to integrating technology with language teaching. The decline by the third-year group between 30-39 years to use technology for teaching has a direct impact on the main objectives of the ICT program, which is to prepare preservice teachers to integrate technology with their teaching. The third-year students between ages 30-39, as they were in their final year, must have developed a positive cognition of technology that translated to its potential integration with instruction. However, this was not the case in this study; instead, the group showed a decline. The cause of this decline may be attributed to the challenges the preservice teachers cited in the qualitative section of this study, such as large classes, lack of practice, slow Internet, and power outages.

Overall, the challenges preservice teachers encounter in developing countries on issues of technology compromise the adoption and integration of the same to the classrooms. As revealed by this study and, also, as observed by Jaffer, Ng'ambi, and Czerniewicz (2007), one of the challenges facing technology in Africa, including Swaziland, is having a large number of students in the classrooms, which makes it practically difficult for ICT instructors to support students in a timely manner. And if students do not get support quickly, they lose focus and interest in technology. However, besides the challenges facing the adoption of technology in Swaziland such as class size, practice time, Internet, and power outages, the importance of integrating technology with instruction in ESL cannot be underrated; thus, solving these challenges is crucial for education to thrive in Swaziland, including other similar ESL contexts. If these challenges are not mitigated, they continue to thwart all concerted efforts to integrate technology with instruction. Also, these challenges compromise the teacher's positions in executing their educational mandate, including the use of current educational metaphors. Teachers

are crucial in effecting educational changes (Ertmer & Ottenbreit-Leftwich, 2010), and it is through effecting current educational metaphors that a 21st century ESL teacher can be validated.

As noted by Armstrong and Yetter-Vassot (1994); Blake (2000); Brett (1997), and Pusack and Otto (1990) learners benefit a lot when technology is incorporated into the classrooms. Therefore, beyond all these challenges, teachers have the responsibility to pave ways for new innovations in education, including integrating technology into the classrooms (Kim, 2002) in order to expose learners to a variety of materials that support learning (Montelongo & Herter, 2010). Thus, if these challenges are not mitigated, the attempt to improve education, especially teaching English as a second language using technology is threatened at its core, not only in Swaziland, but also in other ESL contexts with challenges similar to that faced by Swaziland.

## CONCLUSION

The study examined the impact and cognition of technology on preservice teachers of English in Swaziland, where English is taught as a second language (ESL). The lens through which this study examined the phenomena was the diffusion of innovations theory and the grounded theory. The results of this study revealed myriad challenges facing the adoption and integration of technology to support language instruction in Swaziland. These challenges can be mirrored in other ESL contexts. Therefore, this study serves as a springboard for more research on ways to improve the adoption and integration of technology to support instruction in ESL.

Also, this study can be used to inform policy makers and curriculum designers on critical issues revolving around the adoption of technology to support instruction in ESL. However, more empirical research must be conducted on a large scale, covering more teacher education institutions. For instance, this study did not collect data from a large sample size; therefore, expanding data collection to a large sample can unearth more challenges that this study did not establish, regarding the adoption and integration of technology with instruction in Swaziland.

*Dr. Patrick Mthethwa recently graduated from Southern Illinois University, Carbondale.*

## REFERENCES


Armstrong, K., & Yetter-Vassot, C., (1994). Transforming teaching through technology. *Foreign Language Annals, 27* (4), 8-15.

Atkins, N. E., & Vasu, E. S. (2000). Measuring knowledge of technology usage and stages of concern about computing: A study of middle school teachers. *Journal of Technology and Teacher Education, 8*, 279-302.

Blake, R. (2000). Computer mediated communication: A window on L2 Spanish interlanguage. *Language Learning and Technology, 4* (1), 120- 136.

Blyth, C. (1999). Implementing technology in the foreign language curriculum: Redefining the boundaries between language and culture. *Journal of Educational Computing Research, 20* (1) 35-40.

Bradley, T., & Lomicka, L., (2000). A case study of learner interaction in technology enhanced language learning environment. *Journal of Educational Computing Research, 22* (3) 123-140.

Brett, P. (1997). A comparative study of the effects of the use of multimedia on listening comprehension. *System, 25* (1) 62-78.

Conrad, M., & Munro, D. (2008). Relationships between computer self-efficacy, technology, attitudes and anxiety: Development of the computer technology use scale. *Journal of Educational Computing Research, 39* (1) 51-73.

Creswell, J. W. (2003) Research design: *Qualitative, quantitative, and mixed approaches*. Thousand Oaks, CA: Sage.

Egbert, J. L., Paulus, T. M., & Nakamichi, Y. (2002). The impact of CALL instruction on classroom computer use: A foundation for rethinking technology in teacher education. *Language Learning & Technology, 6*, 108-126.

Ertmer, P. A., & Ottenbreit-Leftwich, A.T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education, 42* (3), 255-284.

Finn, S., & Inman, J. (2004). Digital unity and digital device: surveying alumni to study the Effects of a campus laptop initiative. *Journal of Research in Technology Education, 36* (3), 297-317.

Fullan, M. (2001) *The meaning of educational change* (3rd. ed). New York, Teachers' College Press.

Gamst, G., Meyers, L., & Guarino, A. (2008). *Analysis of variance designs: A conceptual and computational approach to SPSS and SAS*. New York: Cambridge University Press.

Hannafin, M. J., & Land, S. M. (1997). The foundations and assumptions of technology-enhanced student-centered learning environments. *Instructional science, 25* (3), 167-202.

Kramsch, C., & Andersen, R. (1999). Teaching text and contexts through multimedia. *Language Learning and Technology, 2* (2), 31-42.

Kim, H. (2002). Teachers as a barrier to technology-integrated language teaching. *English Teaching, 57* (2), 35-64.

Kuang, L. (2000). English teachers' barriers to the use of computer-assisted language learning. *The Internet TESL Journal, (6)* 12, 56 -78.

Lam,Y. (2000). Technophiliacs, technophobia: A preliminary look at why second-language teachers do or do not use technology in their classrooms. *Canadian Modem Language Review, 56* (3), 389-420.

Lasagabaster, D., & Manuel Sierra, J. (2003). Students' evaluation of CALL software programs. *Educational Media International, 40* (3-4), 293-304.

Lee, S., & Son, J. M. (2006). The use of ICT in Korean middle school English classrooms: Practices and challenges. *English Language Teaching, 18* (1), 49-73.

Liu, Y., Theodore, P., & Lavelle, E. (2004). Experimental effects of online instruction on teachers' concerns about technology integration. *International Journal of Instructional Technology and Distance Learning, 1*, 1-67.

Loucky, P. (2005) Combining the benefits of electronic and online dictionaries with CALL Website to produce effective and enjoyable vocabulary and language learning, *Computer Assisted Language Learning, 18* (5), 389-416.

Mallette, M., & Mthethwa, P. (2012). Web. 2.0 literacy: Enacting a vision, imagining the possibilities. *Research in the Schools 19 (1)*, i-iv.

Montelongo, J., & Herter, R. (2010). Using technology to support expository reading and writing in sciences classes. *Science Activities, 47*, 89 -102.

Ministry of Education Report (2008). A National Report of the Kingdom of Swaziland. Jaffer, S., Ng'ambi, D., & Czerniewicz, L. (2007). The role of ICT's in higher education in South Africa: One strategy for addressing teaching and learning. *International Journal of Education and Development, 3* (4), 1-15.

Johnson, R. B., & Christensen, L. (2012). *Educational research: Quantitative, qualitative, and mixed approaches*. Thousand Oaks, CA: Sage.

Nunnally, J. (1994). *Psychometric theory*. New York: McGraw-Hill.

Oh, E., & French, R. (2007). Preservice teachers' perception of an introductory instructional technology course. *CALICO Journal, 24* (2), 253-267.

Pusack, J., & Otto, S. (1990). Applying instructional technologies. *Foreign Language Annals, 23* (5), 48-72.

Redmond, P., Albion, P. R., & Maroulis, J. (2005, March). *Intentions and Reality: Preservice teachers' ICT Integration during Professional Experience*. Paper presented at the 16th International Conference of the Society for Information Technology & Teacher Education (SITE 2005), Phoenix, USA.

Rogers, E. M. (2003). *Diffusion innovations* (5th ed.) New York: The Free Press.

Selami, A. (2013) Teachers' perception about the use of computers in EFL teaching and learning: The case of Turkey. *Computer Assisted Language Learning, 26* (3), 214-233.

Somekh, B. (2008). Factors affecting teachers' pedagogical adoption of ICT. In *International handbook of information technology in primary and secondary education* (pp. 449-460). Springer.

Stepp-Greany, J. (2002). Student perceptions on language learning in a technological environment: Implications for the new millennium. *Language Learning & Technology, 6* (1), 165-180.

Suh, S. (2004). Technology training and English language teacher education in Korea. *Proceedings of CLaSIC 2004*, Singapore, 1040-1048.

Shin, H., & Son, J. (2007). EFL teachers' perception and perspectives on Internet-assisted language teaching. *CALL-EJ , 8* (2), 1-13.

Strauss, A. L., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and technique*. Newbury Park, CA: Sage.

Torkzadeh, G., & Pflughoeft, K., Hall, L. (1999). Computer user perception, training effectiveness, and self-efficacy: *An Empirical Study, Behaviour & Information Technology, 18* (4), 299-309.

Watson, G. (2006). Technology professional development: Long-term effects on teacher self-efficacy. *Journal of Technology and Teacher Education, 14* (1), 151-166.

Warschauer, M. (2003). *Technology and social inclusion: Rethinking the digital divide*. Cambridge: MIT Press.

Williams, J. A., Berg, H., Gerber, H., Miller, M., Cox, D., Votteler, N., McGuire, M. (2011). "I get distracted by their being distracted": The etiquette of in-class texting. *Eastern Educational Journal, 40* (1), 48–56.

Yildirim, S. (2000). Effects of an educational computing course on preservice and in-service teachers: A discussion and analysis of attitudes and use. Journal of Research on *Computing in Education, 32* (4), 479-495.