Chapter #23

ANALYSING INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) SKILLS OF SETSWANA STUDENT TEACHERS AT A UNIVERSITY OF TECHNOLOGY IN SOUTH AFRICA

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ABSTRACT
The use of ICT has become an indispensable component of education in modern times. Recently, most teachers, including indigenous language teachers, have been involved in integrating technology into their classroom practices. But there is a lack of research on integrating ICT by Setswana student teachers at higher education institutions. This study aims to investigate the competency levels of Setswana student teachers in using ICT in their classrooms. A total of 20 student teachers were purposively selected to participate in this study. Data was collected using classroom observations and interviews. The SAMR model was used as a data analysis tool to determine the extent to which Setswana student teachers can integrate ICT in their classrooms. The results of this study indicate that the student teachers' competence to use ICT was still at a lower level. They predominantly only have basic computer literacy skills, such as word processors, PowerPoint, and other digital resources. The study revealed that the student teachers' ICT integration levels were still at the substitution and augmentation levels.

Keywords: SAMR model, Setswana language, information and communication technology, teacher education, integration.

1. INTRODUCTION

Technology's evolution and application play a role in every aspect of modern life. In education, to enhance learning outcomes, most higher learning institutions have been investing in providing students and teachers with access to technology and enhanced learning through various types of computer technology, ranging from personal computers (PCs) in the "conventional" form of desktops and laptops to the relatively more portable form of tablet PCs. Setswana students are now better positioned to integrate technology into classrooms than in the old education system.

The use of technology provides Setswana student teachers with many opportunities to practice the Setswana language and involve themselves in authentic environments of language use (Kramsch &Thorne, 2020). Tseng (2019) has identified some language learning areas in which technology holds great promise, including phonetics, grammar, vocabulary, reading, writing, translation, auditory comprehension, literature appreciation, and testing. Mello (1996) has stated that Setswana vocabulary learning through technology can be flexible and effective. Internet-based technology has increasingly developed for years, by using the Internet of Things (IoT) for learning Setswana vocabulary has become more common than before. Turgut and Irgin (2009, p.761) reiterate, "The internet has opened up a world of possibilities for improving the vocabulary of students". It is observed that although

many students are born in a technologically rich world, they might not be skillful users of technology (Bennett, Maton, & Kervin, 2008). In the context of the higher education institution, student teachers could learn Setswana mainly using smartphones, computers, or laptops; however, they could not use such tools for their Setswana language learning in general and particularly learning Setswana vocabulary, indicating that Setswana students struggle in employing appropriate strategies for Vocabulary Learning Strategies (VLS) through technological tools.

2. LITERATURE REVIEW

Setswana is an indigenous African language belonging to the Sesotho language group of the Sintu language family. It is also the language spoken by the Batswana people. This is a group of tribes of Sintu origin that makes up a significant part of the population of the country of Botswana. Setswana is one of South Africa's 12 official languages, and is also spoken in Botswana, Namibia, and Zimbabwe. It is therefore designated by the African Academy of African Languages (ACALAN) as a cross-border language, and as a scarce skill by the South African Qualifications Authority (SAQA). Setswana speakers are the fifth largest language group in South Africa and are found mainly in North-West. The language is spoken by more than four million people, which constitute about 8% of the South African population.

Technology in Language Learning (TELL) refers to using computers as a technological innovation to display multimedia to complement teaching methods (Patel, 2014). The main objective is to determine ways to use all kinds of technology, including computers, hardware, software, and the internet, to develop and improve language learning. Research studies have affirmed that technology and technological devices could be used to engage Setswana vocabulary learning in developing skills (Kramsch & Thorne, 2002). Groot (2000) maintained that TELL tools could be effective in helping students to learn a considerable number of words in a short period. Furthermore, Song and Fox (2008) stated that using mobile devices could motivate students to learn and remind them to work on the entailed learning vocabulary tasks.

However, TELL provides more learning, as it promotes learner autonomy and independence to Setswana student teachers who control the pace of progress and the materials presented to them. Additionally, it increases students' engagement and motivation while facilitating communication and meaningful interactions in which technology-related tasks approach more real contexts (Lamy & Goodfellow,1999; Ortega, 1997) point out that technology provides an equal opportunity to Setswana students.

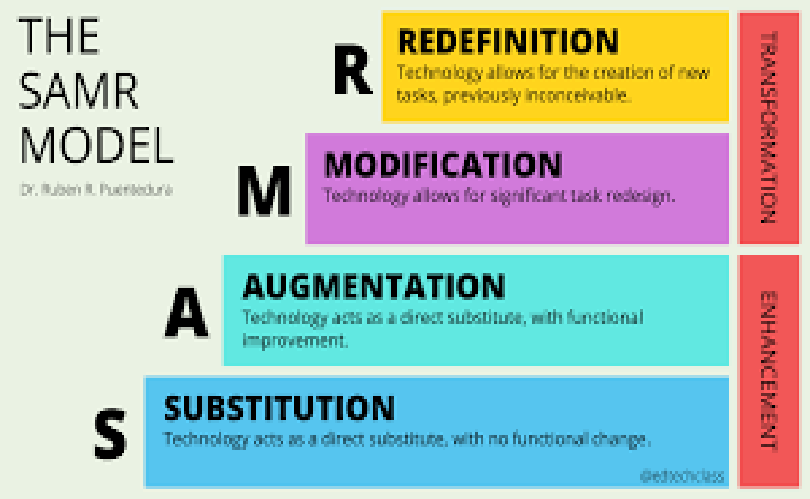
2.1. Theoretical Framework

The Substitution, Augmentation, Modification, and Redefinition (SAMR) model was employed as the framework of the study. The theoretical importance of enhancing the integration level of Information and Communication Technology (ICT) by Setswana student teachers is justified by Substitution, Augmentation, Modification, and Redefinition (SAMR) model. Dr Ruben Puentedura (2006) developed the SAMR model that divides classroom technology integration into four levels. Substitution, Augmentation, Modification, and Redefinition are abbreviated as "SAMR". Then, in 2013, Puentedura categorized the Substitution and Augmentation levels into Enhancement and the Modification and Redefinition levels into Transformation.

At the Substitution level, digital technology is substituted for analogue technology. For example, in a Setswana teaching and learning classroom, the student teacher chooses to substitute a set of hard copy test review questions for digital versions. At the Augmentation level, technology is exchanged, and the function of the task or tool positively changes in some way. However, a student teacher may describe and accurately interpret and apply the SAMR model Puentedura (2014) shared Mueller and Oppenheimer's (2014) comparative study of student teachers taking digital or longhand notes. In his presentation materials, Puentedura focused on the change in the task (i.e., typing on a computer versus writing longhand on paper), this substitution negatively impacted Setswana student teachers.

To help teachers personalize learning and aid pupils in visualizing challenging topics, the SAMR model was developed. When integrated classroom technology makes teaching and learning for both teachers and students smoother, such as during remote and blended learning, the SAMR Model can be particularly effective. Puentedura (2006, 2013) was used as the framework to evaluate technology integration. The SAMR model was developed to examine how technology is infused into teaching and learning activities. Furthermore, it is to encourage Setswana student teachers to augment instructional activities by using technology.

Figure 1.
Dr Ruben Puentedura (2006) SAMR Model.



At the **Substitution** stage, technology is directly substituted for a more traditional teaching tool or method. It is a simple, bare-bones, direct replacement (Puentedura, 2006; 2013; 2014). Substitution stage might help student teachers to save time and space by eliminating arduous pen and paper operations. Rather than printing out twenty-plus paper resources that clutter the closet, student teachers can use technology to manage resources with a few clicks. Substitution is also a far more approachable way to learn technology soft skills than modification and redefinition. It's the ideal time for pupils to become acquainted with new technology before student teachers begin to improve their learning (Puentedura, 2006; 2013; 2014).

With the **Augmentation** stage, the technology is again directly substituted for a traditional tool or method, significantly enhancing the student experience (Puentedura, 2006; 2013; 2014). At the augmentation stage, technology contributes to the learning process in ways other than convenience. It may provide your students with a better knowledge of a hard topic or make it more engaging in ways that traditional techniques cannot Puentedura (2006; 2013). It also enables the introduction of more self-directed and student-centered learning. Students can begin actively learning without requiring ongoing teacher-led teaching by using technology as a source of information.

Using the SAMR Model, teachers are starting from enhancement to transformation at the **Modification** step; this is a real modification to the lesson's design and learning objectives, not a replacement or addition. "Does the technology significantly alter the learning task?" is the crucial query here (Puentedura, 2006; 2013; 2014). Students, for example, can collaborate on shared documents or work in big groups, enabling seamless cooperation and knowledge exchange. Peer-to-peer collaboration fosters a more cooperative and dynamic class culture. Technologically enhanced activities also enable students to produce inspired and innovative work that is not limited to paper. Some students will leap at the chance to appear in front of a camera, while others would go to any length to climb the worldwide Mathletics leaderboard. (Puentedura, 2006; 2013; 2014).

The SAMR model's final stage, **Redefinition,** illustrates how integrating technology in the classroom can improve the student experience. In this situation, the question is whether teachers' use of technological tools enables them to reimagine a conventional learning assignment in a way that would not be feasible without technology, producing a novel experience (Puentedura, 2006; 2013; 2014). Learning can be redefined to integrate it with the actual world and achieve meaningful results. It also teaches students valuable technology soft skills including digital collaboration, communication, computer literacy, and the capacity to adapt to new systems and processes.

The model satisfies the need of student teachers to use the integration level of Information and Communication Technology (ICT) in the classroom to make teaching and learning more effective. ICT are powerful tools in teaching as teachers believe that using technology in teaching is inevitable, they like to and want to learn more Gonen (2018).

Figure 2.
Integration of ICT by Setswana students.

The above figure illustrates how Setswana students use technology and how does their learning get an impact if they use technology. They also find it more interactive, as well as full of interesting areas, when aided by ICT.

3. RESEARCH METHODOLOGY

The research design was qualitative and focused on classroom observation and focus group interviews. This study investigated the extent to which university student teachers specializing in Setswana teaching used ICT for their studies and for their teaching practice. To carry out this investigation, a qualitative inquiry was used, which according to Denzin and Lincoln (2011) involves the study of anything in its consistent environment to attempt to make sense of it regarding the meanings people assign to it, using among other things, observations, interviews, and personal experiences.

The first research approach used in the study was observations. Observations are a key research technique used in a variety of fields, including the natural sciences, social sciences, psychology, and others. It comprises conducting systematic study on a topic or event by thoroughly and deliberately examining it (Cohen, Manion, & Morrison, 2018). The researchers immersed themselves in the Setswana II subject classes, spending approximately six (6) months in the classroom. Different, ICT equipment, for example, Laptops and cell phones were used to take notes during the classroom observation sessions, and a checklist was used with the following categories: Substitution, Augmentation, Modification, and Redefinition.

The second phase was the focus group interviews conducted with second-year student teachers who have registered Setswana II. A focus group interview is a sort of group interview in which data emerges from participant interaction. One of the key characteristics of semi-structured interviews, according to Cohen et al (2018), is the interactional flow of dialogue between two or more participants. Dialogues were undertaken with student teachers to study the difficulties they face when using ICT, when they organize and present their classes. The population of this study comprised 20 second-year students registered at the University of Technology in Setswana II. In both phases of the study, purposive sampling is used in this research (Maree, 2016). The second-year students who participated in the study were divided into groups for the first and second phases of the study, and a checklist was used as a guide for observations.

3.1. Aim of the Study and Research Questions

This study aims to investigate the competency levels of Setswana student teachers in using ICT in their classrooms and using the integration of technology categorized into each SAMR level. That is Substitution, Augmentation, Modification, and Redefinition.

The study sought to answer the following research questions:

- What problems do Setswana student teachers experience when integrating ICT in their classrooms?
- What are the students' perceptions regarding using laptops, projectors, smartphones, and tablets in the classroom?
- Does the SAMR model assist student teachers in improving their involvement in integrating technology into their classroom practices?

Procedure

The following steps taken to equip students with modern technology in the classroom.

Stage 1. Internet connection and connectivity

The use of internet allows students to find amazing convenience, they can find various kinds of help, tutorials, and other kinds of assisting material which could be used to academically improve and enhance their learning.

Stage 2. Using projectors and visuals.

Visual images always have a strong appeal compared to words. PowerPoint presentations and projections are used in the classrooms to keep the learning interactive and interesting.

Stage 3. Digital footprint in the classroom.

The digital footprint has resulted in round the clock connectivity with students that are available for different kinds of assignments or be of assistance with applications in development and learning.

Stage 4. Online classes with the use of technology.

Online classes have now been used as a platform since COVID 19. This is a concept that would be used to facilitate teaching and learning. The online classes scenario around the world is more prominent among students who look for flexible times to their convenience.

Students' attitudes were predicted by computer attributes, cultural perceptions, and computer competence. The observation points to the importance of students' vision of technology itself, their experiences with it, and the cultural conditions that surround its introduction in classrooms, in shaping their attitudes toward technology and its subsequent diffusion in their educational practice.

3.2. Data Analysis

Data were analysed using checklist analysis, and the responses were grouped into themes and later into subthemes according to research questions.

Table 1.
Levels of SAMR model.

Level	**Percentages**
Substitution	15%
Augmentation	15%
Modification	35%
Redefinition	35%

From the table above, the Setswana student teachers preferred learning without functional change. Only forty-eight per cent (48%) of the respondents of Setswana student teachers refer to technology to substitute other learning activities.

Only twenty-eight per cent (28%) of the respondents of Setswana student teachers refer to the technology used to replace other learning activities but with additional functions.

Only twelve per cent (12%) of the respondents of Setswana student teachers refer to technology to redesign learning activities.

Only 10 per cent (10%) of the respondents of Setswana student teachers refer to the technology used to create tasks.

4. FINDINGS

The Setswana student teachers have infused varied types of technology into instructional activities. The technology integration has undertaken the enhancement (Substitution and Augmentation) and Transformation (Modification and Redefinition) stages. It implies that technology, which falls into Modification and Redefinition levels, enables Setswana student teachers to transform learning for students. On the part of the Setswana student teachers, it can be inferred that the use of technology may widen Setswana student teachers' knowledge and skills of Setswana.

Technology integration could encourage students to be more creative and autonomous learners. The use of technology is expected to enhance Setswana student teachers learning effective teaching. Furthermore, the findings display that the Setswana students' perception of applying Technology in the classroom, signifies that even though Setswana students were enjoying and experiencing the usage of technology in the classroom, they should be given more time to work with computers and learn more by using them regularly in the classroom.

5. DISCUSSION

The study sought to answer the following research questions:

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- Does the SAMR model assist student teachers in improving their involvement in integrating technology into their classroom practices.

First question

Lack of students' confidence

S3: I am not confident when using ICT in the classroom because I lack skills in using it.

S12 I am not confident, I lack behind, my fellow students are doing better than I am.

S8: I think we need sufficient time to work on the computer to gain confidence.

This clearly shows that students do not have enough time to work on computers, they lack confidence as they doubt their skills of using the computers in the classroom.

Second question

Students' perception about using ICT in the classroom.

S2: ICT are powerful tools in teaching and learning. Students can watch videos that are closer to real life, presentation compared to printed books.
S20: Through technology I can get important information for Setswana lessons, e.g. the Setswana songs, and learn more about Setswana culture.

This clearly shows that students are excited by using ICT in the classroom. Materials related to Setswana language can be used for teaching and learning. Students know how to access the internet and get some information from it.

Third question

Technology integration in the classroom

S12: Technological developments like projectors, computers, PowerPoint presentations, have become great sources to help grasp the concept easily.
S11: ICT has made our lives easy by attending online classes during COVID 19.

S5: With the introduction of online programs there is hardly any need to be present physically in the classroom.
S17: Students can participate more in the classroom and that makes the classroom more interactive and interesting.
S6: ICT allow students to discover and learn through new ways of teaching and learning in the classroom.

Students' views about The SAMR model show that they have improved their ICT skills. They enjoy and understand in using computers in the classroom. Most of them find it very easy to access ICT.

6. CONCLUSION

Although Setswana students are faced with some difficulties in implementing technology in the classroom, they see the significance in technology and in need of using technology in the classrooms. The findings of the research on Setswana teachers' perceptions and challenges to the implementation of technology in the Setswana classroom could be seen as students who are eager to learn more about the techniques of ICT. The researcher as well has a positive perception of the use of technology to teach in the classroom to assist students facilitate their lesson. The use of ICT in the classroom helps them to obtain information easily and quickly. What makes the classroom conducive is that ICT becomes more interesting than discussion and teaching without using any tool.

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