

EXPLORING THE INTEGRATION LEVEL OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) BY 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) reiterate, "The internet has opened up a world of possibilities for improving the vocabularies of students". It is observed that although many students are born in a technologically rich world, they might not be skilful 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

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 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". 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.

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). 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). Using the SAMR Model, you 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). 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).

The SAMR model was employed as the framework of the study to translate the purposes. 2006 Puentedura developed the SAMR Model, which contains Substitution, Augmentation, Modification, and Redefinition. 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.

3. Research methodology

The research design was qualitative and focused on classroom observation and focus group interviews. The researchers immersed themselves in the Setswana II subject spending approximately six (6) months in the classroom. ICT, 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.

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 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:

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

3.2. Sample

The population of this study comprised 20 second-year students registered at the University of Technology in Setswana I. In both phases of the study, purposive sampling is used in this research (Maree,2007). 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.

3.3. Data analysis

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

3.4. Findings

Integration of ICT by Setswana students:

Table 1. Levels of SAMR model.

	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. Discussion and conclusion

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.

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