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An analysis of English Education Preservice Teachers' Technology Integration viewed from the SAMR Model

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Abstract
This case study examines how technology is integrated by English preservice teachers during teaching practicum. The purpose of this study is to answer two research questions as follows: 1) What technology do English Education preservice teachers integrate into their teaching practicum? 2) How do English Education preservice teachers integrate technology into their teaching viewed from SAMR Model? The data were collected from in-depth interviews with three EFL preservice teachers and their teaching artifacts. Data analysis that was conducted using the interactive model revealed eight applications that were frequently used by the participants. There are three main patterns of the application use: to present material, to give an assessment, and to store files (teaching materials or students' works). Viewed from the SAMR framework, the utilization of technology by the participants was categorized as Substitution and Augmentation. The Modification and Redefinition categories were not identified. It means preservice teachers' use of technology during teaching practicum serves as a replacement for old technology and does not redesign tasks or rely on technology.
Keywords: preservice teacher; SAMR Model; teaching practicum; technology integration;

INTRODUCTION

Chapelle (2010) stated that technology had become an integral part of academic life, especially for language teachers. Rosetta Stone did a survey of foreign language teachers in the United States and also mentioned that the majority of foreign language teachers said they use digital tools and resources for language training. For example, they used the internet to find teaching resources like videos or online textbooks. Furthermore, the language teachers claimed they arranged and posted their lesson information online. From these two studies, it is evident that education and technology are inseparable.

This is continuous and aligns with the concept of technology integration. Integrating technology into learning introduces a new set of variables into the context and

adds complexity due to technology's changing and evolving nature, Hilton (2016). At the same time, preservice teachers in Indonesia are encouraged to use technology in their teaching practicum. Teaching practicum is a compulsory course that must be taken by students of the Faculty of Teacher Training and Education and is usually taken in the third year of their studies. For approximately 3 months, under the supervision of a lecturer and teacher mentor, preservice teachers apply the theories they have learned from previous courses to prepare, implement and evaluate teaching in secondary schools.

Several frameworks can be used to evaluate the use of technology in learning, such as Technology Integration Matrix (TIM), Technological Pedagogical Content Knowledge (TPACK), and Substitution, Augmentation, Modification, and Redefinition (SAMR); this study employs the SAMR learning model (Substitution, Augmentation, Modification, and Redefinition) to meet suitable teaching and learning. Of the three, SAMR is decided to use in analyzing the technology integration carried out by preservice teachers during teaching practicum. The consideration for the researcher is that it has concise components and boundaries that are easier to understand than the other two frameworks. A related study (Hilton, 2016) stated that SAMR seems to be most simply related to student-centered design. In this context, each activity is analyzed for specific opportunities to integrate technology to enhance students' self-learn. Teachers can gain more knowledge by considering their technology integration from a SAMR perspective because it may enable new ways to improve future teachings using new technologies. Romrell et al. (2014) also stated a similar idea that SAMR could be utilized as a decision-making tool to evaluate teaching design at substitution, augmentation, modification, and redefinition components.

The SAMR model was first popularized by Ruben Puentedura which consists of 4 components grouped into two parts: the enhancement stage consisting of substitution and augmentation, and the transformation stage consisting of modification and redefinition in integrating technology in the learning process, Puentedura (2015). Although Ruben Puentedura describes four components of technology integration, SAMR is not a framework that categorizes the hierarchical levels of technology integration in a learning process. SAMR is the accessible framework for teachers to determine what technology integration is suitable and adequate to achieve learning objectives. The components in SAMR are technological integration starting from using the most straightforward technology, namely Substitution, and the most complex, Redefinition.

Based on the concept of the non-hierarchical SAMR model, this research examines how SAMR is applied in analyzing the technology integration of English preservice teachers during their teaching practicum. It is intended to avoid judgment on the learning preservice teachers do with technology integration. This study aims to answer the following research questions; 1) What technology do English Education preservice teachers integrate into their teaching practicum? and 2) How do English Education preservice teachers integrate technology into their teaching viewed from SAMR Model?

LITERATURE REVIEW

Technology Integration

Technology integration is using technology by teachers to achieve goals and practical learning. The integration of technology in the classroom allows students to learn

and complete their assignments in a more focused and flexible way along with technology. The presence of digital tools drives the effectiveness of learning activities and the form of learning media called software, in which the internet runs applications and online platforms. The technology integration provides the advantage of making the educational process independent of the time and location of the student. Learning can be more effective and efficient with the use of technology. Students can further expand their knowledge and technology skills with technology integration and broaden their ability to do their assignments with technology. The student's knowledge increases with more information they can get from the internet and online media, not only limited to books. Students' technological skills will be further enhanced by increasingly sophisticated and easy-to-access online applications and platforms to assist their learning. Beyond the benefits, of course, there are challenges for a teacher in integrating technology into their learning. Riasati et al., (2012), in her study, concluded that five barriers challenge technology integration in the classroom. The barriers discussed in his research are 'lack of access, 'lack of time,' 'lack of effective training,' 'teachers' attitude,' and 'students' attitude.' These barriers have consequences that can adversely affect learning.

Technology Integration Framework

In examining how technology is integrated in learning, there are several frameworks that are commonly used. Among them are Technology Integration Matrix (TIM), Technological Pedagogical Content Knowledge (TPACK), and Substitution, Augmentation, Modification, and Redefinition (SAMR). TIM is a technology integration framework that combines five interrelated characteristics with five levels of technology integration. It is developed by the Florida Center for Instructional Technology (2019). The combination of typical indicators and integration levels results in 25 cells that are relevant for online or face-to-face learning. TPACK is defined as a framework that is a unit of content, pedagogy, and technology elements that can assist teachers in effective technology-based learning. This framework was developed from Shulman's idea of Pedagogical Content Knowledge. TPACK is a complex interaction that is divided into three main parts of knowledge: Content (CK), Pedagogy (PK), and Technology (TK). This framework requires a deep sensitivity to its components. What is considered when using this framework for learning evaluation is not only internal learning but also externals such as demographics, culture, and other things related to the components of this framework. SAMR model is a framework intended to improve the integration of technologies into regular learning for educators that was popular in late 2012 by Puentedura. This framework utilizes four categories to analyze the different components of technology integration used in education. These categories stress a linear hierarchy that prioritizes providing improved learning.

Of the various frameworks related to technology integration, this study used the SAMR model to analyze technology integration by preservice teachers. SAMR can provide an overview of how teachers in their teaching practicum integrate technology in the classroom. This framework supports the purpose of the research analysis, which is to explain how technology integration is linear and non-hierarchical. In addition, the four categories in this framework are less complex than other frameworks. As evidenced by Hilton's 2016 study, SAMR is easier to apply as a reflective lens. The results of the study

revealed that teachers learned more about their technology integration by thinking about it from a SAMR perspective, and they were able to use SAMR to develop ideas for future technology use.

SAMR

The category Substitution, Augmentation, Modification, and Redefinition are organized under two categories, "Enhancement" and "Transformation,". Substitution and Augmentation are classified as "Enhancement," implying that they use technology to replace and/or improve existing tools in the learning task. In contrast, Modification and Redefinition are classified as "Transformation," implying that they provide new learning opportunities that would not be possible without technology.

The substitution of the SAMR Model modifies a set of possible learning tools and activities. Technology continues to replace traditional methods in augmentation, just as it did in substitution, but it also creates more efficient learning methods. Following augmentation, the component of modification changes in the most fundamental ways to provide new chances not accessible with the previous technique. When learning improves, transformative experiences occur at the redefinition component. This is a significant step forward that will allow teachers and students to reconsider their teaching methods in view of student needs

RESEARCH METHOD

Research Design

This research was conducted in the undergraduate English Education Department of Teacher Training and Education Faculty (FKIP) of a University in Indonesia. Using a descriptive qualitative research design, this study presented detailed descriptions of the data that had been collected from three English preservice teachers. The researchers aimed to dig deeply into the information regarding the integration of technology by preservice teachers during teaching practicum seen from SAMR model so as to obtain results that provide future benefits.

Participants

`The participants of this study were three preservice teachers who were practicing teaching at the time. The three participants carried out teaching practicum at different school levels; vocational high school, junior high school, and senior high school. In this section, ethically, the researchers also ensured that the preservice teachers were voluntarily and not forced to join this study. This was indicated by the consent letter that had been approved by the three preservice teachers. The information provided by the participants was for academic purposes only. Participants' identities were hidden in the final research report to maintain anonymity.

Data Collection

This study obtained data from interviews and analysis of teaching artifacts. Practically, the interviews were conducted using Google Meet because it was not possible for researchers and participants to meet due to teaching practicum schedules. By using open-ended questions, participants were able to provide responses based on their experiences that were not limited by the researcher's perspective. The questions in this interview were developed from the research questions. The interviews were conducted in

Indonesian and recorded. The participants adjusted their time and availability. The interview transcripts were then translated into English for the research report. Meanwhile, the analysis of teaching artefacts was conducted by re-opening documents and teaching media or objects used during the teaching of in-service English teachers. Then, the analysis was conducted by reading the documents and media or teaching objects and retrieving information that supported the research.

Data Analysis

Data analysis is how researchers summarize the data collected from participants. Researchers analyzed the data using the interactive mode proposed by Miles, Huberman, and Saldana (2014). The data analysis process is data collection, data condensation, data display and drawing conclusions and verification.

Data was collected through interviews and analysis of teaching artifacts. The interview process explored how technology integration is implemented by preservice teachers during teaching practicum. Then coupled with the process of analyzing teaching artifacts such as lesson plans, teaching materials, assignments and other documents. Followed by after the data is collected, the data goes through data condensation where this process sorts, focuses, and organizes the data so that it becomes relevant to answer research questions. In this process, data condensation allows for the categorization of data and the discovery of new findings beyond the research problem.

Collecting information arranged in a concise and easily accessible form so that analysts can see what is happening and draw conclusions that can be accounted for or move on to the next step of analysis is data display. In this study, after condensing the data, researchers displayed the data in the form of tables. By displaying the data, it is hoped that it will be easier to understand the data. The last stage of data analysis is writing conclusions. In this stage, the researchers made a preliminary conclusion. This initial conclusion is expected to answer research questions based on qualitative data taken from interviews and teaching artifacts analysis, which was to map the degree of preservice teachers' technology integration based on the SAMR model. after the data is collected is data condensation, data display, and finally conclusions.

FINDINGS

This research tries to find out; 1) Technology integrated by English education teachers into their teaching practicum 2) Technology integration done by English education teachers based on the SAMR model. The preservice teachers' interview results and the analysis of teaching artifacts were collected and analyzed to answer the research questions.

1. **Technology integrated by English education teachers into their teaching practicum.**
   The applications that English education preservice teachers most frequently used in their teaching practicum

   The data analysis revealed eight applications that the participants used during their teaching practicum. From the use of these eight applications, they are then divided into three categories based on their functions. The categories are material presentation, assessment platform, and teachers' file storage. As an overview, below is a Table 1 of the list of applications in three categories.

   Table 1. *List of Applications and Their Functions*

Material presentation	Assessment platform	Teachers' file storage
PowerPoint	Padlet	Google Drive
Google Documents	Quizizz	
	Google Forms	
	Kahoot	
	Live Worksheet	

The interview results showed that in delivering learning materials, the preservice teachers used PowerPoint presentations and Google Documents. All three preservice teachers involved stated that they use PowerPoint presentations when delivering materials in the classroom. PowerPoint Presentation is an interesting medium according to the participants because, besides helping the teachers in delivering the material, it also attracts the attention of students to pay attention to the material that the teacher presents in front of the class. In using PowerPoint Presentations, it is also considered easy by preservice teachers with LCDs and projectors provided by schools and their personal laptops. This finding is confirmed by the interview results of the three participants who stated that they used PowerPoint and one participant also used Google Docs as a material delivery. Preservice teachers stated, "I use PowerPoint presentations in class as learning media or media to help me deliver teaching material….", "I use a PowerPoint Presentation to explain the material to students….".

One participant also used Google Docs to deliver materials to students. It was stated by preservice teacher; "I use the Google Documents application as handouts for learning materials. So, I made handouts through Google Documents, and then made PowerPoint Presentation materials from these handouts….". The context of using Google Docs is still connected to the use of PowerPoint Presentation. The participant created learning materials/handouts on Google Docs which she would later make into more summarized and brief PowerPoint presentation to be delivered in front of

the class. The materials on Google Docs are distributed by preservice teachers before or after class as learning materials for students outside the classroom. This research also revealed the benefit of these applications for delivering material. These application is not only make it easier for preservice teachers to prepare and use, but also attract the attention of students so that students can be more controlled, focused, and understand the material better than only with books or orally. Moreover, it helps the students to reduce their boredom.

The researcher found Padlet, Quizizz, Google Forms, Kahoot, and Live Worksheet as the applications used in assessing the students. These applications, except Padlet, have the same assessment role and usage. Quizizz, Google Forms, Kahoot, and Live Worksheet were used by the participants as platforms for game-based quizzes. It is in line with preservice teacher in the interview; "The assessment application that I am trying to apply to students is Quizizz, especially to evaluate students on learning that has been carried out with a test…". Similar features of each application were used by preservice teachers for several purposes. Among them are quizzes for material recall, remedial, and grade-taking. One of the prove was from preservice teacher's statement about usage of Google Forms for remedial; "I am not focusing on using Google Forms for a test. I usually use Google Forms to remedy the test scores of students who are still below average. So, I do not use Google Forms often because most students get a good score on the test."

Meanwhile, Padlet was used by preservice teachers for exercises. It can be seen from preservice teacher's statement; " I use Padlet for students to write practicum sentences during classroom learning. For example, I ask students to write examples of Conditional Sentence...." The digital whiteboard feature displays the students' answers when they are asked to write answers related to the material such as parts of narrative text and grammar such as tenses, conditional sentences, and others. This assessment application provides an exciting new atmosphere in assessment activities for students.

Assessment applications also brought benefits to preservice teachers when using them in the classroom. Quiz applications with game-based features are attractive to students, making the class more fun and making students more competitive to get the best score. A good relationship between students and preservice teachers also arises with a joyful classroom situation. For teachers, this assessment platform helps them to efficiently prepare and distribute assessments, and also makes it easier to collect students' scores for reports.

Google Drive is an application that provides online storage facilities. One of the participants used Google Drive as a file storage medium during his teaching practicum. The preservice teacher stated; "During my teaching practicum, I used Google Drive to save students' assignment. Besides that, I also save some files that I use for learning, such as learning modules." The participant considered accessing this application easy for him and his students in learning. The participant intended to save the files in Google Drive are personal files related to teaching practicum such as teaching modules, lesson plan, and assessment file. Additionally, for the students, the preservice teachers aimed to use Google Drive to collect the students' assignments.

This application usage reveal benefit for the preservice teacher. Some benefit of the preservice teacher's experience in using Google Drive as a file storage medium is that it helps to organize the files that he used during teaching practicum. In addition, because they are digitally stored, the files are safe from damage and loss. The two-way benefit for preservice teachers and students is that it is easily accessible anywhere and anytime with internet access.

2. The technology integration based on the SAMR model

Substitution

Substitution represents replacing the traditional learning technology with the digital one. In this study, the researcher found that PowerPoint Presentation, Google Docs, Padlet, and Google Drive are included as substitution components in the SAMR model as a replacement for previous traditional technologies. This is proved by the results of interviews with preservice teachers. One example of the replacement of traditional technology to digital is from one of the participants who used PowerPoint presentation in delivering material for students from the previous teacher delivering material with photos and screenshot module. Google Documents is also included to substitution. Preservice teacher's use of Google Documents is as a handout of material. The preservice teacher made the handout to be distributed to students. This is a part of the substitution component of the SAMR model because Google Documents technology replaces the previous technology, that is book, that was previously used as a medium for delivering material.

The data analysis found that Padlet is also one of the technologies that replace the traditional whiteboard with the digital. Although Padlet is a digital whiteboard, it is used by preservice teachers as an assessment media, which is an exercise in making sentences. From this situation, the role of this application did not change the function of the whiteboard. Two of the preservice teachers used Padlet in their teaching practicum. Another application that shows a substitution component is Google Drive. The role of Google Drive used by pre-service teachers is to store learning files as well as a place to collect student assignments. Preservice teachers used Google Drive to replace the previous method of storing files from physical files to digital files.

Augmentation

The augmentation component in SAMR is similar to the substitution component. What distinguishes the two is that there is a change in the function of the technology integrated by the preservice teacher in the classroom. The data analysis showed that the three participants integrating technology reached the augmentation component. The applications are Live Worksheet, Google Forms, Kahoot, and Quizizz All participants used the application to give assessment to their students. The role of these game-based quiz applications that paper-based assessments do not have is the automatic score that appears after the students have completed the assessment which enhances the assignment practice. These enhancement cannot be obtained in paper and pen assessment. In this context, besides the replacement of traditional applications with digital ones, there is also a change in the function of the assessment application, which is to collect grades automatically.

From the findings related to SAMR model, the researcher concluded that none of the three participants reached the modification and redefinition components. The participants focused more on integrating technology as a substitute for traditional methods to digital methods. The researcher did not find that the learning implemented during the teaching practicum leads to redesigning tasks and reliance on technology.

DISCUSSION

In this study, the research findings showed that preservice teachers used PowerPoint presentations, Google Documents, Padlet, Google Forms, Kahoot, Quizizz, Live Worksheet, and Google Drive as the teaching-learning technologies in their English classes. Concerning the results of this study, there are similarities with the research conducted by Lintang (2021), which investigates the extent to which pre-service teachers use technology for ELT, focusing on the SAMR model. The results of this study show that preservice teachers use several applications in their teaching practicum, namely Microsoft PowerPoint, Microsoft Word, the Youtube website, WhatsApp, and Google Classroom. The results of the research conducted by the researcher show similar results in the context of SAMR. Although the technology or application used by preservice teachers in both studies is different, it can be said that it is more or less the same, both describe the context of how technology integration is carried out by preservice teachers during their teaching practicum.

The result of integration of technology from present and previous study showed that preservice teachers reach the component of substitution and augmentation seen from SAMR model. None of the participants reached the component of modification and redefinition. Other studies that discussed the use of technology seen from the SAMR model are from Ahmed & Chao, (2018) and Taylor et al., (2020). Both of these studies also resulted in the integration of technology in the substitution and augmentation components like the present study.

The study by Ahmed discusses how Students with Visual Impairment (SVI) use Assistive Learning Technology (ALT) to help students learn math. With one researcher being visually impaired and the other being sighted, this study examined how the use of assisted learning technology is viewed with the SAMR model. The use of technology in this study was limited to replacing visual information with audio or tactile information, and then expecting SVIs to "act" like their sighted peers. Meanwhile, Taylor's research explored how digital technology was used in 16 classrooms in six geographically and socioeconomically different elementary schools. The technologies used in substitution components included digital delivery of worksheets, vocabulary sharing, and reading passages through iReady, or other paper-based LMSs such as Canvas or Showbiz. The augmentation stage was also found in the use of game-based quiz apps.

The research results from the previous studies revealed that many technologies used reached substitution and augmentation. However, according to the researcher, the focus of the three pre-service teachers is to replace traditional learning methods with new methods without redesigning the task or transforming the lesson. This can happen if the participants may not have sufficient technological knowledge, especially with SAMR

glasses. This is why the researcher thinks that it is important for preservice teachers to learn the SAMR Model. Preservice teachers can use this model in self-reflection when they decide to integrate technology into future learning. Apart from that, the SAMR model is easy to implement. This was proven in research conducted by Hilton (2016) regarding the application of SAMR and TPACK to reflect integration technology. The research results show that teachers agree that SAMR is an easy model to apply as a reflection in integrating technology into learning. Preservice teachers were able to utilize the SAMR Model to gain greater insight into how they integrated technology and to come up with ideas for how to use the technology more effectively in the future.

Technology has the potential to have a positive effect on learning activities. Traditional teaching technology is starting to be increasingly replaced with digital ones. Technology integration provided many benefits for learning. From the results of interviews with participants, the integration of technology carried out by participants during teaching practicum revealed several benefits, including making it easier for teachers to teach, helping to archive files easily, increasing student enthusiasm for learning, making it easier to collect student assignments, making learning more engaging, providing an environment more lively and more efficient in preparing lessons. The results of this study are quite similar to those of Yunus et al., (2013) regarding the advantages and disadvantages of technology integration in ESL reading and writing teaching. Their research revealed the benefits of technology integration in classrooms; engaging students' interests, enhancing their learning process, increasing their vocabulary knowledge, and encouraging effective learning.

The success of learning with technology integration must also be supported by the tools used. From the results of the study, it was found that there was a lack of support for implementing technology integration in the classroom. An example is the unavailability of a complete LCD projector and internet access. If learning with technology is not supported by supporting tools, then learning with technology will be difficult to implement or even cannot be implemented. This result was in line with previous research by Andrei, (2017), which revealed that even though teachers appeared to be at ease using the technology in their classrooms, some issues persisted, including a lack of training, limited time and technology support, and a number of situations of a technology malfunction.

CONCLUSION

This study yields two main findings: (1) eight applications that preservice teachers use during teaching practicum [PowerPoint presentations, Google Documents, Padlet, Google Forms, Kahoot, Quizizz, Live Worksheet, and Google Drive], and (2) technology integration by preservice teachers as seen from the SAMR Model reached the substitution and augmentation components. The findings imply that the use of technology by preservice teachers only replaces old technology with digital technology. None of them found to redesign task in modification component and not relying on technology which include to redefinition component. This study is beneficial for self-reflection when teachers decide to integrate technology into learning. As such it is suggested that it is important for teachers to consider integrating technology in future learning.

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