Integrating SAMR learning model in vocational education

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Abstract. The rapid development of technology in learning demands teachers to use ICT-integrated learning models. One of the applicable learning models is called SAMR, a learning model integrating technology comprehensively. The model, which was first introduced by an educational consultant namely Dr. Ruben Puentedura, uses a hierarchy to describe cognitive levels using technology as a learning tool. It is believed that the use of technology in learning should be proportional and in accordance with the learning needs. ICT integration in a vocational education system impacts the roles of teachers and students. Thus, it is expected that the use of ICT will be a good facilitator and collaborator in teaching and learning process which demands the students to be more active.

1. Introduction
The demand of teachers in the 21st to create such innovative and creative learning integrated with ICT as an attempt to enhance is a serious issue [1]. The development of ICT has a huge impact towards education; therefore, integrating ICT in teaching and learning processes is a task teachers need to develop [2]. However, some teachers still find it difficult to integrate ICT in their class [3]. One of the difficulties is the fact that technology keeps developing; this, to certain extent, demands teachers to adjust to the development to be applicable in learning [4].

ICT integration in learning actually introduces a set of new variables in the context as well as adds complexity since the nature of technology is to keep changing and developing [5]. To cope with the challenge, this study employs a learning model namely SAMR (Substitution, Augmentation, Modification, and Redefinition). This model, which consists of four parts trying to shift technology to the next level, aims to maximize the quality of education [6]. This model in learning process is like lenses which enable teachers to see how to integrate ICT in their class. Teachers are able to integrate ICT in accordance with the model, which is based on each step of the model comprising substitution, augmentation, modification, and redefinition [7]. Integrating SAMR model in learning can also give huge contribution to the skills of students in using technology [8].

Students often find it more comfortable in using and understanding ICT in learning; they know that it is a tool in learning for student-teacher interaction [9]. Several studies have shown that technology has potentials to improve ICT literacy by providing software and application as learning media. Thus, SAMR model is used to integrate ICT in learning [10].

ICT integration in learning basically helps the implementation of learning. In addition, when students get used to using ICT in learning, their digital literacy indirectly increases. As a matter of fact, digital literacy is one of the most necessary skills in the industry.
2. Research Method
Articles and journals analyzed in this study are based on SAMR model and the search is done through several database. Analysis and discussion in this paper describe the SAMR model in the process of learning integrated with ICT. This paper administers literature study from previous research discussing the use of SAMR model in learning integrated with ICT.

3. Results and Discussion
Technology as a learning tool shows rapid change in the digital era [11]. The use of technology in learning should be in the right portion. In other words, its use needs to meet the purpose of the learning so that it does not cause any troubles in learning processes.

SAMR model is of the learning models integrating technology. The model appears to be simple yet able to describe technology integration to learning process comprehensively [12]. The model, which functions as a learning tool [13] contains four level as follows.

1. Substitution: in this level, technology substitutes the previous tools without changing their functions.
2. Augmentation: in this level, technology is used to replace the previous tools by some improvement in functions.
3. Modification: in this level, technology possible changes the works to be better.
4. Redefinition: in this level, technology creates something extraordinary.

![SAMR Model](image-url)

**Figure 1.** SAMR Model

The implementation of SAMR model, as illustrated in Figure 1, can actually be seen in the use of computer in our daily life.

1. In substitution level, computers with a word processing software such as MS Word functions to replace the writing process previously done with paper and pencil.
2. In augmentation level, we use the same software with different functions available, such as to check spelling and even grammar.
3. In modification level, we can use the same computer to connect to the internet. By using an application called Google Docs, we can simultaneously work in distance with our colleagues. The app even allows us to correct each other’s work.
4. In redefinition level, we can add several more interesting things to our work using the same computer and internet. Some of which are using multimedia such as digital story telling.
Of all the four levels of SAMR model implementation, the substitution level changes a bit of the traditional tools and activities in learning. In the next level, which is augmentation, technology still replaces the traditional ways as the substitution level does; however, it also makes more efficient ways in learning. Following augmentation, modification level, modifies the most significant methods to open up new chances not found in the traditional way. Finally, in the last step, the redefinition level, transformative experiences occur when learning itself is becoming better. This is the step giving a big opportunity for both teachers and students to redefine their educational system according to the needs of education which are digital natives.

SAMR model actually reminds us of Bloom’s taxonomy [14], a model frequently used in cognitive learning. SAMR has actually been implemented in higher education to motivate students. However, SAMR is good to implement in vocational schools as well. In that study, the primary advantage of SAMR is enhancing motivation, interaction, and collaboration.

4. Conclusion
SAMR learning model has been proven to be effective to be implemented by teachers in integrating ICT in learning. In this model, there are four levels which are able to integrate ICT in learning including substitution, augmentation, modification, and redefinition. This model uses a hierarchy to describe cognitive levels. The model can also be parallel to Bloom’s taxonomy model since they both share identical levels.

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