The Implementation of TPACK (Technological Pedagogical and Content Knowledge)-Based Learning: The Comparison of Students' English Learning Outcomes Using the Blended Learning Model and Discovery Learning Model

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Abstract

This study aims to determine the comparison of the English learning outcomes between the students who taught by Blended Learning model and Discovery Learning model. Moreover, this study also aims to reveal which model is more effective in enhancing the students' English language learning outcomes. This experimental research involved two experimental classes in which the first experimental class taught using the Blended Learning model with the help of WhatsApp software (online class), while in the second experimental class taught using Discovery Learning model with the help of Power Point software (offline class). The sample who are involved in this study was 30 students. The data collected using writing test. The results showed that the students learning outcomes were increased in both the experimental 1 and 2. However, the mean score of the students who taught using Discovery learning is higher than the mean score of the students who taught using Blended Learning. Thus, it can be concluded that H_1 was accepted and H_0 was rejected. Further, the applying of Discovery Learning assisted by PowerPoint software is more effective than using Blended Learning model assisted by WhatsApp. The application of the Power Point-assisted Discovery Learning enables the students more focus as they take responsibility in learning, then it allows the students to learn pacely.

Introduction

21st century learning accentuates the learning to be able to develop competencies as a whole, where students are not only provided with a number of core subjects according to their specialization, but also need to be equipped with non-academic competencies that are more interpersonal and intrapersonal. Learning must be able to help the students to have the ability to think critically, master science and technology, and collaborate (Afsyah, 2019). Moreover, Ontario (2016) expresses that the strategies needed to realize 21st century learning include learning focused on deeper learning practices, learning to apply pedagogical strategies that can support deeper learning practices, the technology used is directed at efforts to help students develop skills. And in order to make it happen, learning based on the TPACK (Technological Pedagogical Content Knowledge) framework is present as a solution. TPACK-based learning (Technological Pedagogical Content Knowledge) as a learning framework developed for 3 components, namely teaching materials, teaching and technology (Nurfitri, 2019).

Based on the results of observations of teachers and students at SMP Muhammadiyah 2 Makassar, there are problems in the learning

process, namely the low mastery of students in English learning. This can be seen from the learning outcomes of students who can reach the KKM only 30% of the number of students in one class, the basic problem is that students sometimes find it difficult to understand English material and need hard work if they want to better understand every concept in English material that is taught or learned, so that students will find it difficult to improve their ability in English at a higher level from the aspect of understanding, for example in their ability to apply, analyze, evaluate and create. As a solution to the problems that have been raised, then by applying TPACK-based learning (Technological Pedagogical Content Knowledge) can help students improve students' understanding of learning English. TPACK is considered a distinct body of knowledge, which takes into account teachers' understanding of the difficulties students face when they have to learn a particular subject matter domain (Voogt, et al, 2013). The TPACK model shows which components are teacher knowledge for effective technology integration (Akturk & Ozturk, 2019).

Moreover, the implementation of TPACK strategy learning also needs the support of learning model and media to enhance students' learning outcomes. Applying learning model in English learning activities is one of effort attain the learning goals. Inde et al. (2020) propound learning model is one necessary factor in teaching and learning activities as by applying appropriate model, it will help the students to gain the delivered knowledge easily. The two of model that can be combined with technology are blended learning model and discovery learning model. Blended learning model is currently developing in the academic field. This model is used as a trend in the world of contemporary education. According to (Nurfitri, 2019) Blended learning is a combination of online learning and face-to-face learning, so this learning can be applied to any subject, including English subjects especially in procedural text material. There are many previous studies related the effectiveness of Blended model in teaching and learning have been conducted. Lusa, et al. (2021) conducted a meta-analysis of Blended learning model. They concluded that this model has positive effect on students to master the knowledge. Similar with Lusa et al., Bernard et al. 2014 found that technology-assisted Blended Learning can help the students in enhancing

their learning quality and learning outcomes. Hereinafter, Hashemi, A. & Kew (2020) in their study found that Blended Learning is one of learning models that should be considered in English language teaching and learning as it affects positively the integrated skills of English language.

Furthermore, Discovery Learning also believed as one of effective and suggested learning models in 2013 curriculum as it helps the students to gain the knowledge through direct investigation. Bruner in Inde et al. (2020) reveals that Discovery learning assists the students to comprehend the key ideas and structure of the scientific discipline as well encourage the students to be involved actively in teaching and learning activities. Many studies related the effectiveness of Discovery learning also had been conducted. (Singaravelu, 2012) in his study concluded that Discovery learning is effective for students in attaining competency of grammatical in English as it appeals the students to learn English. In line with this, Dukomalamo et al. (2019) and Prasetya & Harjanto (2020) in their studies found that the implementation Discovery learning in the teaching and learning activities can enhance the students' learning outcomes as well their learning activities.

Therefore, this study intends to the implementation of TPACK in learning English using Blended Learning and Discovery Learning model. The objective of this research is to find the comparison between the use of Blended Learning and Discovery Learning model toward the student' English outcomes and to determine which one from both Blended Learning model and Discovery Learning model that has greater affect on students' English learning outcomes.

Literature Review
TPACK

TPACK (Technological Pedagogical and Content Knowledge) is a framework developed by (Koehler & Mishra, 2006). The conceptualization of TPACK comes from the PCK (Pedagogical Content Knowledge) framework introduced and formulated by Shulman (Harris, J., Koehler & Mishra, 2013), where he claims that teachers must know the proper use of pedagogy for effective learning and teaching in their respective subjects or content.This model introduces the relationship between the three basic components of knowledge, namely technology, pedagogy, and content. TPACK emphasizes
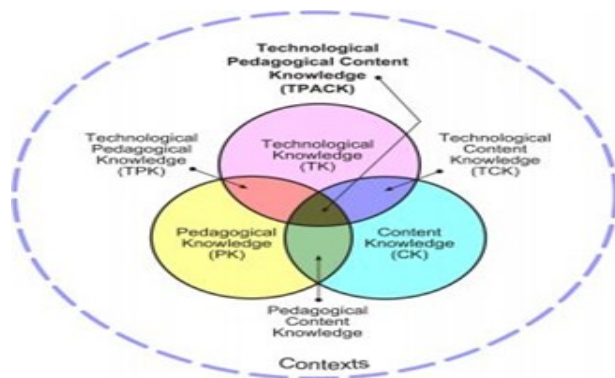
Figure 1. TPACK Framework and its Components

teachers' understanding of how technology can be used effectively as a pedagogical tool and illustrates the fundamental relationship between technological knowledge, pedagogy, and teaching content. certain subject matter (Voogt et al., 2013). Furthermore, the TPACK model shows which components are teacher knowledge for effective technology integration (Akturk & Ozturk, 2019).

In addition, from the three basic components of TPACK, namely technological knowledge (TK), pedagogical integration (PK), and content knowledge (CK), then it is designed as a seven-components model (Chuang & Ho, 2011) which reveals the relationship between the three basic components (Koehler, M. J., Shin, T. S. & Mishra, 2012).

Blended Learning Assisted by WhatsApp

Simarmata (2018) define blended as a learning program in which more than one delivery mode is used with the aim of optimizing learning outcomes and program delivery costs. Furthermore, (Suprabhan & Subramonian, 2015) suggested that Blended learning involves a shift from pure classroom interaction, a teaching style to a more student-centered style. The current education system demands student-centered education and blended learning is the most appropriate way. (Zaeri, 2013) says blended learning is based on various combinations face-to-face learning, Internet learning, and supported learning by other technologies that aim to create an efficient learning environment. In line with this, (Bonk & Graham, 2004) state that the Blended learning system combines face-to-face instruction with computer-mediated instruction.

Osguthorpe and Graham cited in (Bonk, C.J & Graham, 2004) identify six potential benefits that combined learning can offer. First,

blended learning presents pedagogical richness. Some mixed learning systems, for example, are designed to allow students to go through three phases, namely (1) online independent learning to obtain background information, (2) face-to-face learning labs that focus on active learning and application experiences instead of lectures, and (3) online learning and support for transferring learning to the workplace environment. Second, blended learning opens access to knowledge. Third, blended learning facilitates social interaction. Fourth, blended learning facilitates personal agency. Fifth, blended learning offers cost effectiveness and provides the opportunity to reach a large and globally dispersed audience in a short period of time with consistent semi-personal content delivery. And sixth, the learning blender provides easy revision..The recent study focused on the implementation of Blended learning model assisted with WhatsApp software.

WhatsApp nowadays is the most popular media social tool. (Kheryadi, 2017) claims that among varied of media social tool, WhatssApp is considered as popular, simplest and effective tool that can be used by the teachers in teaching. (Alshammari et al., 2017) stated that WhatsApp software enables the teachers to take a preponderant facilitation role in teaching. The teachers can facilitate all the features on this application to support their English language teaching. This application help both students and teacher related the activities in English language teaching and learning (Nuraeni & Nurmalia, 2020). In line with this, Afsyah (2019) states this application can optimize both teacher and students in learning process, thus the teaching and learning process run easily, enjoyably and usefully.

Discovery Learning Assisted by Power Point

Discovery Learning model is as one of suggested learning model in 2013 curriculum. This model allow the students to be involved actively in teaching and learning activities. The implementation of Discovery learning model in teaching and learning process enables the students more enthusiasm, creative and innovative in both finding and solving the problem during learning process (Suyanti & Purba, 2017). In language teaching and learning, this model enables the students to achieve the learning goals by the process of finding and solving the problems in language learning (Syam & Muliati, 2020). Moreover, Junizar & Sudiyono (2020) expresses that Discovery Learning defined as learning process in which the information of material is not provided direct-

ly, but they are required to organize the information independently.

Furthermore, Discovery Learning encompasses the stimulation stages in which the students confronted problem or something that creates such questions and they investigate to investigate independently (Kirschner & van Merrienboer, 2007). In addition, Sarimanah et al. (2019) adduce a number of Discovery Learning advantages, such as; (1) encourage the student to participate actively in learning process; (2) arise the students' curiosity; (3) enable the development of the students' learning skill; (4) make the learning experience more personal; (5) give the students to experiment independently; (6) construct the students' knowledge from their previous knowledge, then they can understand more deeply; (7) make the students taking responsibility for what they have done during the learning process. However, the latest study focused on the implementation of Discovery Learning model assisted by Power Point software.

PowerPoint software is most popular technology applied in teaching and learning process. Dewi & Kareviati (2021) state that PowerPoint is believed able to help both the teacher in preparing and providing the teaching materials, and the students in learning well by attract their interest and motivation in learning. PowerPoint is one of technology media that can support and enhance learning environment as well affect the English classroom positively (Al-obaydi, 2017). It is the appropriate software to create presentations in which variety of media such as, video, sounds, animations and images can be interpreted (Yusri et al in Dewi & Kareviati (2021)). A menu in PowerPoint allows the users to create the learning materials or media to be more interesting, attractive, and enjoyable.

Materials and Methods

The study aimed to determine whether there is a comparison of English learning outcomes between application of TPACK-based learning (Technological Pedagogical and Content Knowledge) using the Blended Learning model and Discovery learning model. It was conducted as an experimental research which involved two experimental classes; experimental class 1 taught using Blended Learning model assisted by WhatApp software (online class), while the experimental class 2 taught using Discovery Learning model assisted by Pow-

erPoint software (offline class). This study implicated 30 students of SMP Muhammadiyah 2 Makassar which it divided into two classes. The sample was chosen purposively based on the English teacher's recommendation. The data was collected by two steps, namely pretest and posttest. Pretest was given in order to know the students' score on English material before the treatment was given, while posttest aims to know the students' score and improvement on English material after the treatment was given. The test consisted of 30 items of questions related to the material that have been taught and it had been validated by an expert in education research. The result of the students' score in both pretest and posttest were calculated and analyzed using Statistical Product and Service Solution (SPSS) 25 in order to reveal the comparison of students' English learning outcomes through using Blended Learning in which assisted by WhatsApp software and Discovery Learning model which assisted by PowerPoint software, as well to determine which learning model is more effective in increasing the students' English learning outcomes

Results and Discussion
Findings

The data of the students' learning outcomes in English language teaching and learning was showed in the table 1. It shows the students' learning outcomes in both Experimental 1 (Blended Learning model assisted by WhatsApp software) and Experimental 2 (Discovery Learning model assisted by PowerPoint software). The following table also shows the improvement of students' learning outcomes from pre test to post test in both experimental class 1 and 2.

The table shows that the comparison of the students' learning outcomes in pretest and posttest. In the first experimental, it does not show a significance difference in which the students' mean score in pretest was 63.60 and the mean score in posttest was 74,73. While, in the second experimental, it shows that there are a significance difference between the students' mean score in pretest and posttest. It was proven by the students' mean score in pretest was 61,13 and in posttest was 76,20. Overall, the students' learning outcomes of both experimental 1 and experimental 2 in pretest and post test was improved. However, the students' learning outcomes in the class of experimental 2 was higher than the students in the class of experimental 2.

Table 1. Paired Sample Statistics

		Mean	N	Std. Derivation	Std. Error Mean
Pair 1	Pre Experimental 1	63,60	15	6,620	1,709
	Post-test Experimental 1	74,73	15	6,453	1,666
Pair 2	Pre Experimental 2	61,13	15	9,195	2,374
	Post-test Experimental 2	76,20	15	8,470	2,187

Table 2. Paired Sample Correlations

		N	Correlation	Sig.
Pair 1	Pre Experimental 1 & Post-Test Experimental 1	15	,925	,000
Pair 2	Pre Experimental 2 & Post-Test Experimental 2	15	,961	,000
Pair 2	Pre Experimental 2 & Post-Test Experimental 2	15	,961	,000

Table 3. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre experimental 1- Post-Test Experimental 1	-15,067	2,576	-665	-16,493	13,640	-22,649	14	,000
Pair 2	Pre experimental 2- Post-Test Experimental 2	-11,133	2,532	-654	-12,535	-9,731	-17,032	14	,000

Furthermore, the paired sample correlation in table 2 shows that in both the class of experimental 1 and 2 that Sig. 000<0,05, thus it can be concluded that there were a significance correlation between the students' learning outcomes on English before the both of Blended Learning model assisted by WhatsApp software and Discovery Learning assisted by PowerPoint software were implemented.

Based on the data on the table 3, it shows that Sig. (2-tailed) 000 < 0.05 in both the class experimental 1 and 2. It means that H0 in this study is rejected and the H1 is accepted. In other words, both Blended Learning model assisted by WhatsApp and Discovery Learning model assisted by PowerPoint software are effective to help the students in increase their English language learning outcomes.

Discussion

The result t-test for both the use of Blended Learning models assisted by WhatsApp as well Discovery Learning model assisted by PowerPoint software has a significant difference in students' learning outcomes of English language teaching and learning. In the finding, it found the different of students' mean score from pretest to posttest in both the classes of experimental in which the students' mean score in Discovery learning class is higher that the students' mean score in the Blended learning class. Thus, it can be concluded that the implementation of Discovery learning assisted by WhatsApp software is better and more effective to assist the students to improve their learning outcomes in English language teaching and learning.

It happens as Discovery Learning is a model that encourage the students learn independently to gain information related the learning material by investigating, finding and solving the problem and take responsibility for what they done. In accordance with this, Saridewi, Suryadi, & Hikmah (2017) propound that Discovery Learning can improve the students' learning outcomes and learning motivation since this model refers to students-centered learning, then it directly increase the students' curiosity in learning activities.

Furthermore, the implementation of Discovery Learning by assisted PowerPoint soft-

ware creates the learning process runs more interesting and enjoyable. This is in line with Syaepudin & Juhji (2020) who adduce that the utilize of PowerPoint software can be used as an alternative to improve the students' interest and motivation in during learning process, then increase their learning outcomes can increase.

Conclusion

The implementation of TPACK (Technology, Pedagogical and Content Knowledge) using Blended Learning models assisted by WhatsApp as well Discovery Learning model assisted by PowerPoint software are effective for the students to enhance their learning outcomes in English language learning. However, the implementation of Discovery Learning model assisted by PowerPoint software is more effective. It was proven from the mean score got by the students in the class of experimental 2 from pretest to posttest was higher than the students in the class of experimental 1. In Discovery Learning class, the students are encouraged to be involved actively in teaching and learning activities (Syam & Muliati, 2020). Moreover, this model enables the students more enthusiasm, creative and innovative in both finding and solving the problem during learning process.

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