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The Effectiveness of ICT-based Learning in Improving English Skills of  
Elementary School Teacher College Students

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Abstract

12's research aims to investigate the effectiveness of ICT-based learning on improving all aspects of the English skills of Elementary School Teacher College students. To achieve that goal, we use an experimental methodology with a pretest and post-test design of two groups, using the cluster random sampling. For this research, there were nine classes of Elementary School Teacher College students who enrolled in the Integrated English course with a total of 311 people as the population. From that population, we took samples consisted of four classes: two classes, consist of 76 people 32 that treated with blended learning, and the other two classes, consisting of 73 people 35 using conventional learning. In this research, we focus on the skillsets of the English Language they are reading, writing, listening, and speaking. To test students' ability in the first three skills, we used some form of descriptions, while for the speaking skills, we collected data using observation sheets. SPSS version 20 was used for the analysis of pretest and post-test data using the Manova test and Normalized gain (N-gain). Manova's result 26 showed that a significant difference in English language skills, which can be concluded that the treatment that combines the Moodle-based e-learning and face-to-face classes has effectively impacted students' English skills.

**Keywords:** ICT, Moodle, reading, listening, writing, speaking, Integrated English

1. Introduction

1.1 The Motivational Background

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The Indonesian government has recognized the important 33 of the English language by including it in the education system, from primary to higher education. English as an international language is used in a very broad distribution range as the world's language of information, science, and technology, and as a medium of communication between peoples of nations (Purba and Panday, 2014). Many faculty members use technology upon teaching and pedagogical practice, with experiences 17 in using Moodle technologies (Veletsianos & Kimmons 2013). It is a requirement for this generation to advance in terms of science and technology by having the ability to comprehend the universal

language, especially in the development of science and technology that is full of communication in English and also with the establishment of Indonesia as a member of the AEC (ASEAN Economic Community) (Purba, 2014).

English is a universal language that is used in all parts of life and fields of art, science, humanities, hospitality, and social sciences. International trade and diplomatic relations also use English as a communication tool (Harmer, 2001). As one of the developing countries, Indonesia needs to have the competence to communicate in English to enrich knowledge in absorbing various information written in that language. In other words, if learning English is ignored, there will be a decrease in the mastery of science and technology. Moreover, as an international language, English can connect people across the world in various aspects, such as for business and education purposes (Kim, et al, 2019).

In Indonesia, the government makes English a compulsory subject for students, starts from elementary school to high school level. Even at the higher education level, all study programs must provide English language courses for 1 or 2 semesters, even if the discipline taken is not related to English. Hence, it shows how important the mastery of English. English is one of the needs in today's life. Also, the ability to speak English is one's pride. People who can master foreign languages, including English, will have more value in their life.

Problems in learning English are not only found at the level of primary, secondary, and upper education, but continue to the tertiary level. Several studies have proven the problem in English language skills. It applies to both students with English major and non-English majors. To fulfill their obligations as university students, they are required to take English courses and even have to pass a TOEFL test with a passing grade score. The problem found that most university students do not have strong fundamental English skills, which makes them feel a burden while learning it at the university level (Hiew, 2012).

In one public university located in North Sumatra, Indonesia, English is taught comprehensively in a course called Integrated English, which weighs 3 credits and is delivered in the third semester. More specifically, there is a major called Elementary School Teacher Education Study Program, which is a major that prepare university students as professional elementary teacher candidates. After graduation, they will become the elementary school teachers, who will also teach basic fundamental English to elementary school pupils. Therefore, it is significantly important that they possess comprehensive understanding and mastery in English skillsets, they are: reading, writing, listening, and speaking. Based on the researchers' experience teaching the Integrated English course, students were generally having difficulty in learning English even though they must master the four skills of English must (Simbolon, 2014).

The Integrated English learning process is still conventional in nature, focusing on English language skills, general English, not English for specific purposes. Moreover, the English material provided is still passive English not active English so this is still not following the students' needs. Such learning results in a lack of student motivation to learn English so that it affects learning outcomes. The low learning outcomes of English are also possible because of students' perceptions of English. Because of the nature of language that is hardly found in Indonesian, many students find English lessons are difficult to learn. As a result, they skip class, and when they attend class, it is not because they do not want to learn English, but because they are afraid of failing the subject.

Limited time is another problem in teaching English. Lecture time in class is often short. Even though there are many materials to deliver, the face to face class meeting is once a week. Therefore, most of the time, lesson plans are not executed as programmed. If this situation occurs continuously, the lecturer will fail to achieve the goals previously set. Another problem faced in teaching English, specifically in this public university, is the overcrowding of students in English classes. The number of students in a typical classroom can range from 40-45 people. It will be difficult for lecturers to carry out learning activities because it is not possible to personalize teaching. Thus, the learning outcomes were not as expected.

## 1.2 Propose Solutions

### 1.2.1 E-learning

The use of ICT-based learning, which is often called e-learning has been known as a significant power to help the learning process. Nowadays where almost activities business organizations as well education are closely related to information technology e.g. Internet, information application systems, and other ICT devices (Purba and Panday, 2015, Panday and Purba, 2015, Aileena, et al, 2019). Some previous studies report the successful story of using e-learning in improving students learning experiences (Ahmadi, 2018–Hsu, 2012). One way to overcome the above problems is by teaching English based on Information and Communication of Technology (ICT). In learning English with ICT media learning materials can be made as attractive as possible, such as tenses or grammar that can be presented with an attractive and simple appearance. Not only is that, in English, there a correct way of pronunciation. With this ICT, lecturers can insert audio recordings containing words in English so students are expected to be motivated and can remember more strongly.

The presence and progress of ICT in today's global communication era has provided opportunities and expansion of interactions this also happened between lecturers/teachers and students, between peers, between students and learning resources can occur anytime and anywhere without being limited by space and time (Purba, 2014, Purba, et al, 2019). Also, with the help of ICT, the process of delivering and presenting learning materials and ideas can be more interesting and enjoyable. On the other hand, the presence of ICT as the use of technology presents challenges for lecturers and teachers to be able to master it so that they can choose and utilize ICT effectively and efficiently in the teaching and learning processes they manage (Simbolon, et al, 2020).

The utilization of ICT for education, especially English learning, has become a necessity that cannot be delayed any longer. E-learning is one form of the use of information technology, especially internet technology that supports the learning process. With this e-learning, lecturers can put learning material, give assignments and quizzes for evaluation, and monitor and establish communication with students via the web (Damnjanovic, et al, 2015, Costa, 2015).

### 1.2.2 Moodle

Moodle is one of the mediums to provide e-learning. Moodle provides several useful tools for both teachers and students and accommodates communication during learning. Moodle (Modular Object-Oriented Dynamic Learning Environment) is a web-based education platform. Moodle is an open platform of online learning that brings many advantages for education system stakeholders. Educators and learners can enjoy the learning process because of the useful features provided in Moodle. There are many types of research regarding how Moodle can help improve the quality of the education system (Chen, et al, 2014, Tsai and Talley, 2014–Kuimova, et al, 2016).

Moodle helps teachers or educators through the use of its features, such as but not limited to a quiz, workshop, forum, assignment, and questionnaire (Mirabolghasemi, et al, 2014). Some assignments and quiz types are automatically graded, thus brings efficiency in the learning process. It saves educators' time in grading students' work and it helps students to improve their learning by getting instant feedback on their work (Costa, 2015). Another aspect of Moodle that brings benefit to the education system is the centeredness of learning materials. Students can access all the learning materials they need, anywhere, and anytime, and therefore it motivates students to keep on learning and reviewing their progress on their own pace (Damnjanovic, et al, 2015, Costa, 2015, Caputi and Garrido, 2015).

In using Moodle as a learning medium, some factors influence the success of Moodle's implementation (De Domenico and Cohrs, 2016). Firstly, institution management has to support the infrastructure of online learning that is part of the digital era (Pulkkinen, 2013). The infrastructure to implement Moodle is divided into hardware, software, internet network, and brain-ware. Since

Moodle is a web-based education platform, it needs some software to be installed in specific hardware or virtual (cloud) server. The software consists of the Moodle's installation package, the webserver software (like Apache, IIS, etc.), and the database server software (like MySQL, MariaDB, PostgreSQL). After the installation and configuration are finished, it needs to be published in the internet network by registering the Domain Name Server (DNS) of the Moodle's server. The most important element for the success of online learning implementation using Moodle is the brain-ware. The brain-ware is the human resources that are involved directly or indirectly to the learning process using Moodle. They can be divided into four categories: (1) the system administrator who installs, configures, and maintains the Moodle's platform; the main role is to develop the learning environment, (2) the educators who design the learning material, method, and assessment; their main role is to create the learning contents, (3) the learners who participate on the online learning; their main role is to learn and continuously improve themselves by actively using the Moodle's platform to access the learning materials, and (4) the government (institution management) who finances the learning environment. Thus, the government or institution management has a significant role in initiating the development of the online learning environment in the higher education system.

Secondly, the educators have to at least have the knowledge of how to operate a computer and familiarize them using the web browser. It is important for educators to understand how to upload or download the material from or to the Moodle's platform. In addition to that, it is significant for educators to understand Moodle's main features like choosing the right type of quiz or assignment (Hennessy, 2005).

Lastly, as educators need to familiarize themselves with the web-based platform (Cahir, et al, 2014, Cole and H. Foster, 2007) the learners are also required the same. Learners need to have self-awareness of the importance of education for their own benefit. Moodle is a tool that will help students achieve their learning goals, but it is students' responsibility to do the learning and finish the given tasks which assign to them in guidance to help them learn about the subject. Thus, students will need to use some skills like time management, self-drive or motivation, critical thinking, and basic IT skills (Achmadi, 2018).

### 1.2.3 Moodle used in English learning

Some previous studies were done in regards to finding out the benefit using Moodle in improving students' language skills, especially the English skills (Achmadi, 2018, Hennessy, 2005, Dreyer and Nel, 2003, Coskun and Arslan, 2014). Yet, it is difficult to find research that approaches all aspects of English language skills: reading, writing, speaking and listening in one experiment. Some previous research (Klentien and Kamnungwut, 2015, Musa Ali and Alajab, 2018) explained the use of Moodle-based e-learning for teaching language. Teachers need only have some basics computer skills to start applying this learning method. Moreover, (Fenton, 2015) said that Moodle has more than 70 million users globally, which is aligned with (Berns, et al. 2013).

### 1.2.4 Blended learning

According to (Shechter, 2016), blended learning is a method that combines the use of face-to-face teaching with ICT-based learning platforms such as Moodle, Blackboard, and others. This approach believed to bring advantages for teachers whose not having advanced technological expertise and to give benefits for students' learning outcomes (Tsai and Talley, 2014, Sun, 2014) Moreover (Musa Ali and Alajab, 2018) defined blended learning as "a mix of traditional instructor-led training; synchronous online conferencing or training, asynchronous self-paced study, and structured on-the-job training from an experienced worker or mentor."

## 2. Research Methodology

Realizing the importance of English language skills for the Elementary School Teacher College students, the authors researched to see the effectiveness of the use of ICT-based blended learning. The learning covered all aspects of English language skills they are reading, listening, writing, and speaking.

This research was conducted in one of the public universities in Medan, North Sumatra, Indonesia, in the even semester of 2018/2019 Academic Year. The population included all Elementary School Teacher College students who enrolled in the Integrated English courses during the second semester. The total population was consisting of nine classes totaling 311 people. The sample was selected using cluster random sampling and consists of four classes. Then they were separated into two, the first two classes as an experimental class consist of 76 people, and the two other classes as a control class totaling 73 people. The experimental class uses the blended learning method, which is the combination of Moodle-based e-learning and face-to-face classes. While the control class uses conventional learning, only face-to-face classes. Table 1 shows the type of quasi-experimental study with two groups pretest and post-test design.

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**Table 1:** Research Design: Two Group Pretest - Post-test

Class	Pretest	Treatment	Post-test
Experiment	X <sub>1A</sub>	T	X <sub>2A</sub>
Control	X <sub>1B</sub>	O	X <sub>2B</sub>

### Description

X<sub>1A</sub>: pretest of English skills (reading, listening, writing, and speaking) in the experimental class  
 X<sub>1B</sub>: pretest of English language skills (reading, listening, writing, and speaking) control class  
 X<sub>2A</sub>: post-test of English language skills (reading, listening, writing, and speaking) of the experimental class  
 X<sub>2B</sub>: post-test of English language skills (reading, listening, writing, and speaking) of the control class  
 T: treatment with blended learning using Moodle-based e-learning and face-to-face classes  
 O: conventional learning (only face-to-face classes)

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Experimental classes are using the ICT-based on Moodle-based e-learning. Moodle is one of the world-famous open learning management systems (LMS). LMS is a software used to deliver learning materials and multimedia resources online based on the web. After the lecturer presents each topic in a face-to-face lecture in class, students can access Moodle using their account. Students can study each topic which is divided into four sections and each section has exercises, assignments, and quizzes. Students can repeat the exercise or assignment and evaluate what is learned and can also monitor the progress of their learning.

Data collection techniques were using the English language test instrument. Reading, listening, and writing data are collected using a description test and speaking data using an observation sheet. Data analysis uses the Multivariate Analysis of Variance (Manova) test, with normal and homogeneous data requirements. The effectiveness of the application of learning in improving English language skills is determined based on the average normalized gain score (N-gain). According to Stewart & Stewart (Stewart, and Stewart, 2010), the high and low N-gain can be classified as shown in Table 2.

**Table 2:** Criteria for Improving N-gain in English Language Skills

N-gain of English Language Skills	13 Interpretation
$0,7 < g < 1$	high
$0,3 \leq g \leq 0,7$	medium
$0 < g < 0,3$	low

### 3. Results and Discussion

#### 3.1 Results

Students' reading, listening, and writing skills were measured by giving essays tests while speaking skills were measured by observation. A pretest was given to both experimental and control classes to determine their initial ability in English language skills. Then a post-test was conducted to see whether there was an influence of the use of ICT on English language skills. Both test results obtained were tested using the Manova test with the help of SPSS provided that the data must be normally distributed and homogeneous. Table 3 and Table 4 show the normality and homogeneity of the pretest and post-test data.

**Table 3:** Pretest Data Normality on English Language Skills for both classes

Pretest Data							
No	English Language skills	Experiment			Control		
		Kolmogrov - Smirnov	Sig	Remarks	Kolmogrov - Smirnov	Sig	Remarks
1	Reading	1.29	0.71	normal	1.26	0.81	normal
2	Listening	0.98	0.29	normal	1.12	0.11	normal
3	Writing	1.29	0.07	normal	1.33	0.06	normal
4	Speaking	0.82	0.51	normal	1.38	0.05	normal
Post-test Data							
No	English Language skills	Experiment			Control		
		Kolmogrov - Smirnov	Sig	Remarks	Kolmogrov - Smirnov	Sig	Remarks
1	Reading	1.22	0.11	normal	1.35	0.05	normal
2	Listening	1.14	0.15	normal	1.22	0.10	normal
3	Writing	1.20	0.11	normal	1.19	0.12	normal
4	Speaking	1.13	0.16	normal	1.35	0.52	normal

**Table 4:** Homogeneity Test for Pretest and Post-test on English Language Skills

Data	Class	Sig				Conclusion
		Reading	Listening	Writing	Speaking	
Pretest	Experiment	0.44	0.82	0.06	0.67	Homogen
	Control					
Post-test	Experiment	0.24	0.55	0.08	0.72	Homogen
	Control					

Table 5 and Table 6 show the results of the pretest and post-test hypothesis tests using the Manova test. Thus, it can be concluded that the experimental and control classes have the same ability in terms of English language skills before treatment. After treatment, that is in the experimental class with Integrated English learning using ICT and in the control class with conventional learning it is found that there are significant differences in English skills for each aspect in other words that learning using ICT media has a significant effect on English language skills college student.

**Table 5:** Multi-variants Results of Pretest English Language Skills

No	Effect	Sig	
		Pretest Data	Post-test Data
1	Pillai's Trace	0.063	0.00
2	Wilk's Lambda	0.063	0.00
3	Hotelling's Trace	0.063	0.00
4	Roy's Largest Root	0.063	0.00

Table 6: Test of Between-Subjects Effects

Dependent Variabel	Pretest Data			Post-test Data		
	Df	Mean Square	Sig.	Df	Mean Square	Sig.
Reading	1	11.513	0.504	1	67.482	0.00
Listening	1	8.669	0.430	1	37.800	0.00
Writing	1	0.511	0.877	1	76.263	0.00
Speaking	1	10.707	0.448	1	32.138	0.00

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27 test, post-test, and N-gain percentage of English language skills of the two classes are shown in Table 7, Figure 1, and Figure 2.

Table 7: Average English Language Skills Test Result for both classes

English Language skills	Experiment				Control			
	Pretest	Post-test	% N-gain	Category	Pretest	Post-test	% N-gain	Category
Reading	66.80	88.29	65	medium	66.25	79.23	38	medium
Listening	63.41	87.49	66	medium	62.34	79.16	45	medium
Writing	60.62	85.45	63	medium	60.08	76.23	40	medium
Speaking	61.18	86.93	66	medium	61.30	78.73	45	medium
Average	63.00	87.04	65	medium	62.49	78.34	42	medium

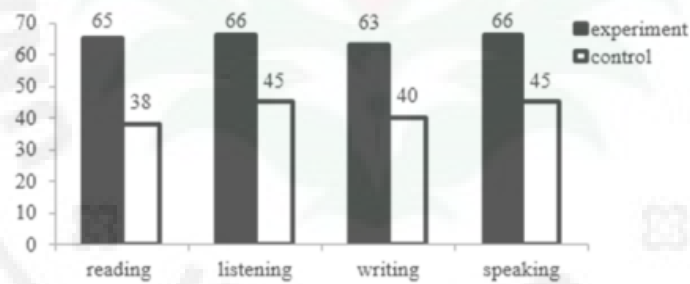


Figure 1: Average Pretest and Post-test between Classes



Figure 2: N-gain improvement in English skills of experimental and control classes

The average value of English language skills in the pretest is almost as large as the average post-test, shown in Table 3. An increasing percentage of N-gain English skills of both classes are shown in each of the medium categories. The percentage increase in N-gain of English language skills of the two classes can be further broken down based on its elements, namely: reading, listening, writing, and speaking which are depicted in Table 3 and Figure 3.



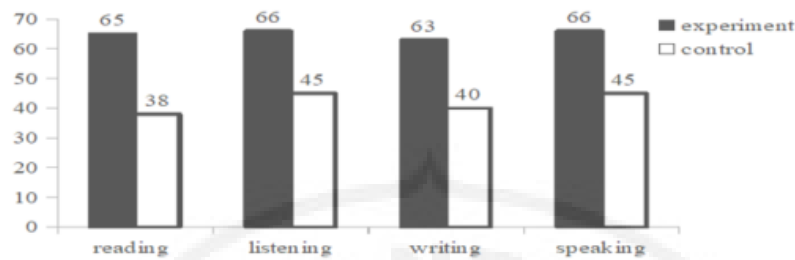


Figure 3: N-gain percentage improvement in English skills based on its components for both classes

### 3.2 Discussion

The utilization of ICT for education, as in English learning, has become a necessity that cannot be delayed any longer. Various ICT applications are available in the community and are ready to be used optimally for educational purposes. It can be carried out in various forms following its function in education. The use of ICT in the learning process of English plays an important role in providing innovation and student motivation (Pavel, et al, 2015, Kuimova, et al, 2016, Caputi and Garrido, 2015, Banditvilai, 2016).

Some features of ICT application that help the teaching and learning process are (1) visualize abstract concepts; (2) provide variation of practice in materials delivery (3) help students to understand difficult materials; (4) simulate processes that are difficult to do manually; (5) allow interaction between students; (6) overcoming limitations of space, time, and energy; (7) facilitate the role of lecturers/teachers as facilitators and mediators who initially acted as the sole conveyors of knowledge; (8) improve user knowledge and skills; and (9) accommodate interactive and more interesting sessions, which can increase student attendance and concentration.

Through this study, the adoption of ICT was applied in a subject called Integrated English. The conventional learning method was replaced by Moodle-based learning in combination with the face-to-face class session. Some college students of a public university in Medan, North Sumatera, Indonesia, were involved in this experiment. They are majoring in Teacher Education, who will become the elementary school teachers after graduation. They are expected to possess English skillsets: reading, writing, speaking, listening.

Students used Moodle as a self-learning medium where students can access all materials everywhere at their convenience and pace. They were able to revisit all topic materials available in the Moodle. For students' reading and writing skills improvement, e-learning provides some readings with exercises and quizzes. Students can do self-review by learning the given right answers for those exercises and quizzes. Using various videos of some native speakers, we intend to motivate students to learn to listen as well as practice speaking skills. After listening, the students perform some speaking exercises in front of the class.

### 4. Conclusion

In conclusion, we found that there were significant differences in English language skills (reading, listening, writing, and speaking) between the experimental and the control class through this pilot research. In other words, there is an effect of the application of Moodle-based e-learning during the Integrated English course to students' English skills. The increase in the percentage of N-gain for English skills is in the medium category. This result is aligned with some previous researches (Tsai and Talley, 2014, Pulkkinen, 2013, Bataineh and Mayyas, 2017, Cordova and T. Dechsubha, 2018, Klentien and W. Kamnungwut, 2015). In addition to that, we found that even though 85% of the students found it easy to use the medium, there was still 15% who found it difficult to learn using

Moodle in which most of them were not familiar with the platform. Thus, the use of ICT, especially the Moodle application provides various benefits for lecturers, teachers, and prospective teachers in English language teaching and learning process.

This pilot research is a step in embracing ICT in delivering an English course. It is far from perfect and has some room for improvement, for example by providing more specific instruction and techniques for each skillset and using gamification and animation to develop students' engagement. This study also proves that the adaptation of creative technology such as Moodle can provide opportunities for new methods and improvement in teaching techniques that are more effective and efficient (Fauzi, et al, 2020, Purba, et al 2020). It is highly recommended to optimize the use of ICT, like Moodle and other technologies to educate students in schools.

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