

The Application of the Experimental Method to Improve Student Learning Outcomes on English Material

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Abstract –This study investigates the effectiveness of using digital English Learning to improve students' English skill. Despite the increasing use of technology in language learning, many Indonesian EFL (English as a Foreign Language) students still struggle with their English skills. Employing a quasi-experimental design, this research involved 32 of semester one students divided equally into an experimental and a control group. The experimental group was taught using digital English Learning, while the control group used conventional conversation methods. The data were collected through pre-tests and post-tests. The results indicate that the experimental group significantly outperformed the control group in English Skill. These findings suggest that digital English Learning is an engaging and effective pedagogical tool to enhance students' English skills in the EFL classroom. The implications for language lectures and curriculum developers are further discussed.

Keywords: Experimental methode, pre-test and post-test, Learning outcomes

I. INTRODUCTION

Language is a system of communication that is organized in an orderly manner and consists of grammar and vocabulary. Language is the main means for humans to convey meaning, both through spoken language and hand signals, and it can also be manifested in written form. Human language is characterized by its cultural and historical diversity, with striking variations between one culture and another as well as overtime. Human language has productive and shifting properties, which allow for the creation of an unlimited number of sentences and the ability to refer to objects, events, and ideas that are not directly present in conversation. The use of human language is based on social conventions and is acquired through the learning process.

The estimated number of languages used by humans in the world today ranges from 5,000 to 7,000. The accuracy of this estimation depends on arbitrary boundaries between what is considered a language and a dialect. Natural languages can be spoken, signed, or both; however, any language can be encoded into a secondary medium using auditory, visual, or tactile stimuli, for example through writing, whistling, gestures, or braille. In other words, human language is modality-free, while written or signed forms are ways to record or encode human speech and natural movements.

English is a Germanic language that was first spoken in England in the Early Middle Ages and is currently the most used language worldwide. English is spoken as a first language by most of the population in various countries, including the United Kingdom, Ireland, the United States, Canada, Australia, New Zealand, and several Caribbean countries; and it serves as an official language in nearly 60 sovereign countries. English is the third most spoken native language in the world, after Mandarin and Spanish. English is also used as a second language and official language by the European Union, the Commonwealth, the United Nations, and various other organizations.

English in the era of globalization functions as a global lingua franca (intermediate language). Mastery of it is the main key to breaking the barriers of international communication, expanding access to information, and enhancing competitiveness in education and the modern job market.

In the business world, English has become the standard in international communication. Multinational companies, financial institutions, and even small businesses that want to expand into international markets use English as the main communication tool. Conferences, negotiations, and communication among employees across countries are conducted in this language to ensure mutual understanding among all parties. For professionals who want to compete in the global market, English proficiency is a very important skill. By mastering this language,

they can expand their networks, open career opportunities abroad, and communicate with business partners from various countries.

The importance of English in an era like today demands that the younger generation be able to master it. However, many consider English difficult to learn for various reasons, ranging from grammar to the difficulty of memorizing vocabulary. Based on this foundation, the writer tried to conduct a study on English language proficiency among university students.

To conduct research related to students' English language skills, the author uses the experimental method to determine the level of English proficiency. where the author divided into 2 groups to determine English language proficiency, namely the experimental group and the control group.

According to Hamdayana (2017:125), the experimental method is a method of giving opportunities to individual students or groups to be trained in carrying out a process or experiment. Through the application of this method, students are expected to be fully involved in planning experiments, conducting experiments, discovering facts, collecting data, controlling variables, and solving the problems they face in a real way.

The experimental method, according to Djamarah (Hamdayana, 2017;125), is a way of presenting lessons, where students conduct experiments by experiencing firsthand what is learned. In the teaching and learning process using the experimental method, students are given the opportunity to learn independently, explore the environment based on the experiments conducted, and observe an object or a phenomenon.

Thus, students are required to experience it themselves, seek the truth, or search for a law and draw conclusions from the process they undergo. Based on the definition described above, it can be concluded that the experimental method is a learning method that gives students the opportunity to carry out environmental exploration activities and conduct experiments to observe an object or phenomenon.

With the increasingly developing digital world like today, it turns out it is not accompanied by good English language skills among students. On that basis, the researcher conducted a study to measure the English language proficiency of students. The problems that often arise in English are as follows :

1. Does the experimental method influence English learning?
2. Does the experimental method affect the level of students' success in English?
3. Does the experimental method affect students' English proficiency?

The main purpose of experimental research is to test hypotheses to determine the cause-and-effect relationship between two or more variables by giving treatment to one group and comparing it with the control group. It aims to measure the effect of certain actions objectively and systematically. Research is essential for advancing knowledge, solving complex problems, and driving innovation across all fields. It enables informed decision-making, improves quality of life through technological and medical breakthroughs, and supports evidence-based policies. Furthermore, it fosters critical thinking, curiosity, and academic growth.

II. METHOD

This type of research is experimental research, which is a research method used to find the effect of a certain treatment on another under controlled conditions. This research was conducted from March to April 2026 in the Information Systems Department, 2nd semester, at Universitas Insan Pembangunan Indonesia. In this study, there are three variables that are the focus of the research, namely the independent variable, the control variable, and the dependent variable. The independent variable in this study is problem-based learning through the experimental method, the dependent variable is students' English language skills, and the control variables are the material, learning objectives, instruments, time allocation, and assessment methods. The research design uses a pretest-posttest control group design aimed at obtaining differences in students' English language skills between the experimental and control classes, so that in the end, the influence of the learning model used can be observed. The following is the learning design table.

Tabel 1. Research design Pretest-Posttest Control Group Design

Group	Pre-test	Treatment	Post-test
Experiment	A1	X	A2
Control	A1		A2

(adapted from Sugiyono)

Description:

A1 = Administration of pretest to the experimental and control groups

A2 = Administration of posttest to the experimental and control groups

X = Treatment in the form of problem-based learning using the experimental method in the experimental class

- = Conventional learning in the control class

Through cluster random sampling, two classes were randomly selected. Then, from these two classes, another random selection was made to choose the experimental class and the control class. The resulting sample consisted of Information Systems A class with 15 students as the experimental group and Information Systems B class with 17 students as the control group. The research activities were conducted in three stages, namely: Preparation Stage At the preparation stage, the researcher prepared everything needed during the research, including: (1) Conducting observations; (2) Determining the research sample; (3) Determining the main material to be taught using problem-based learning through the experimental method; (4) Creating research instruments. Implementation Stage At the implementation stage of the research, the researcher applied the learning model that would be tested. This stage is also the stage for the researcher to collect research data. The steps taken during the implementation of the research are: (1) Administering a pretest to both sample groups; (2) Providing treatment to the experimental class in the form of problem-based learning through the experimental method and to the control class in the form of conventional classroom learning; (3) Administering a posttest to both sample groups. Final Stage In this final stage, research data is analyzed, research data is concluded, and a research report is prepared. Data collection techniques are carried out using testing methods through an English skills test. The skills data consist of pretest data before the treatment is administered and posttest data after the treatment. Pretest and posttest data were obtained using instruments that had been trialed on 32 people. Then the test results were analyzed with validity, reliability, difficulty level, and question discrimination tests. Based on the trial results of 30 questions, 20 questions were deemed suitable for use in pretests and posttests. Question validity analysis used the product moment formula, and for question reliability tests, the Spearman-Brown formula was used, the difficulty index for question difficulty level, and the discrimination index for question discrimination. Data analysis used parametric statistics with t-test pooled variance with a two-tailed test criterion, after testing the data normality using the Chi-Square test and data homogeneity using the F test. Meanwhile, to determine the improvement of students' English skills, the normalized gain (g) test was used.

III. RESULT AND DISCUSSION

The research results are in the form of a description of English language skills data from pretest and posttest using a homogeneity test. The data of pretest results of English language skills in the experimental class and control class on English material can be seen in Table 2 below:

Table 2. Recapitulation of Pretest Data in Both Sample Classes

Component	Learning outcome	
	Experimental class	Control class
Number of students	15	17
Highest score	68	58
Lowest score	32	30
Average	38,3	35
Deviation standard	27,06	20,9
Homogeneity test	homogen	

The pretest results indicate that the average initial test scores of students in both samples were 35 for the control class and 38.3 for the experimental class, with an average difference 3.3. Table 2 shows that the experimental class and the control class are homogeneous, which means both sample classes have the same initial English language skill abilities. Based on these results, the effect of the treatment was analyzed by examining the posttest data.

After the pretest was conducted, both sample classes were given different treatments, followed by a posttest. The English skill posttest data for the experimental class and the control class on English material can be seen in Table 3 below:

Table 3. Posttest Data Recapitulation in Both Classes

Component	Learning outcome	
	Experimental class	Control class
Number of students	15	17
Highest score	82	68
Lowest score	62	42
Average	53	42,3
Deviation standard	34,4	25,5
Homogeneity test	Homogen	

In Table 3 above, it can be seen that the average score of the experimental class after the posttest is also higher than that of the control class, namely the average score of the experimental class is 53 and the average score of the control class is 42.3, with an average difference greater than the pretest result, which is 10.3. Based on the posttest results, both the experimental and control classes experienced an increase, indicating an improvement in the students' English language skills. The experimental class experienced an average score increase of 14.7, while the control class experienced an increase of 7.3. The results above show that the increase in average scores experienced by the experimental class is higher than the increase in average scores of the control class.

The data from the pretest and posttest show that the experimental class experienced a higher improvement in English skills than the control class. This improvement is an influence during the learning process. During English learning, both in grammar and English skills, students carried out practical sessions a total of five times. In each practical session conducted, students were required to write problem-based articles. The articles used demanded a problem-solving process in problem-based learning that covered four aspects of the students' English skills being studied and were designed in accordance with the practical session being conducted.

Thus, in carrying out experimental activities, students engage in problem-solving processes in problem-based learning using the problem skills being studied. Indirectly, this process trains students' English skills to improve. The phenomenon above shows that the experimental class given treatment in the form of problem-based learning through the experimental method has higher English skills than the control class. This is because problem-based learning with the experimental method provides students the opportunity to solve a problem through a scientific thinking process, which simultaneously trains their science process skills.

According to Rusman, problems can encourage the seriousness of inquiry (curiosity). Students' curiosity about a problem is facilitated through the experimental method. The results of this study also further strengthen the theory that through problem-based learning, students not only understand concepts relevant to the problem at the center of attention, but also gain learning experiences related to the skills of applying the scientific method in problem-solving and developing critical thinking patterns. Furthermore, the use of the experimental method in the problem-solving process in problem-based learning provides students the opportunity to search for and discover various answers to the problems they face by conducting their own experiments through scientific thinking.

It is the skill of applying the scientific method that guides students to practice English language skills. The results of this study also reinforce previous research on learning models that have been conducted before. The researcher found that there was an improvement in skills through the implementation of problem-based learning with an inquiry approach. According to the researcher, these English language skills are given to students at the stage of writing the actions carried out in the syntax of the problem-based learning model. When this process is carried out by students, many process skills are trained in the students.

These results reinforce that mastery of English skills for each component tends to increase through the application of the problem-based instruction model, often referred to as problem-based learning. This improvement indicates that English skills begin to grow and develop along with the habits that are carried out and continuous practice through problem-based instruction learning.

IV. CONCLUSION

Based on the problem formulation, research results, and discussion, it can be concluded that the implementation of problem-based learning through the experimental method has a significant effect on the English skills of second-semester students majoring in Information Systems at Universitas Insan Pembangunan Indonesia. Therefore, it is necessary to carry out learning innovations so that students' ability in English continues to improve. There are many English learning materials using digital learning.

As an educator, innovations are needed so that learning is not boring, thereby improving students' abilities.

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