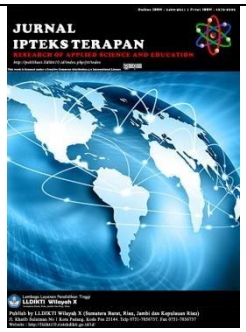

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# THE EFFECTIVENESS OF ENGLISH TEACHING MATERIALS USING TECHNOLOGY TO ENHANCE HIGHER ORDER THINKING SKILLS (HOTS)

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**Abstract**

**Background:** Higher order thinking skills (HOTS) should be included into all aspects of teaching and learning, particularly at the university level in facing digital society 5.0. Teachers must be able to incorporate such abilities into their courses, including their curriculum, syllabus, lesson plan, teaching approach, and teaching materials, as well as their English classes, based on this issue. English teaching materials by using technology is one of innovative way to develop Students' higher thinking skills. This study investigates the effectiveness of English teaching materials by using technology for university students to enhance their Higher order thinking skills. **Method:** This research is experimental research in the form of pre-test and post-test control group design. This research was conducted on the first-year students of Adzkia University in the year 2021/2022. The instrument used in this study is the test. It is used to assess students' HOTS. SPSS was used to analyze the test data quantitatively. **Result:** It is found that students who are taught by English teaching materials using technology have better higher order thinking skills than the students who are taught by using conventional English teaching materials. **Conclusion:** English teaching materials using technology is the effective media to enhance HOTS.

**Keywords:** Effectiveness, English Teaching Materials, Technology, Higher Order Thinking Skills (HOTS)

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## INTRODUCTION

In order to promote Higher Order Thinking Skills in a language classroom, teachers must not only understand the subject matter, but also understand what HOTS are and how they may be integrated into the curriculum, including the textbooks and materials that the teacher and students used in class. [1] Teachers must now incorporate higher order thinking skills into their materials, or, to put it another way, Higher Order Thinking Skills are the skills that should be demonstrated in a language course. The Ministry of Education has defined HOTS as the ability to apply knowledge, skills and values to make reasoning and reflection to solve problems, make decisions, innovate and strive to create something (Curriculum Development Centre, Ministry of Education, 2013). Based on the definition by the Curriculum Development Division, HOTS is focused to apply, evaluate, analyze and create. In the assessment aspect, HOTS items are the items that assess cognitive skills to analyze, evaluate and create. However, HOTS item can also measure cognitive level of application but involving new situation. [2]

HOTS are focused with the application of high-level thinking skills such as synthesizing, assessing, and generating in order to handle productive tasks. [3] Higher-order thinking skills necessitate the use of thinking skills such as analysis, evaluation, and creation or production. As part of HOTS, analyzing is the ability to divide information into parts and organize useful information; evaluating is the ability to reflect on something and make a decision; and creating is the highest ability to generate new ideas or concepts. [4]

Because of the importance of these skills, the Indonesian Ministry of Education and Culture has included them in the national curriculum. It needs teachers to assist students' development as critical and creative thinkers through teaching and learning activities as the curriculum implementer. In light of the aforementioned concerns, teachers must be able to integrate those abilities into their courses, such as in their curriculum, syllabus, lesson plan, teaching technique, and teaching materials, as well as in English class.

The teaching materials is one of the most important components used by both students and teachers to make the teaching and learning process more effective. [5] The material characteristics necessitate the presence of facilities that aid in the learning process and are consistent with the curriculum, which emphasizes innovative learning. Relevant learning facilities can help with learning implementation. [6] It means that teaching materials should enable students to study effectively and teachers to teach efficiently in order for students to achieve all of the competencies specified in the curriculum. [7]

In addition, in this 21th century, English teaching materials oriented to higher order thinking skills is one of the essential components that must be exist in the classroom. Teachers must incorporate high order thinking skills into their materials, or High Order Thinking Skills are the skills that should be manifested in the language course. This material is as guide for the students and teachers to be actively engaged in classroom practices. It suggests that the aspects of HOTS such as skills of analyzing, evaluating, and

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creating should be manifested in the development of the English materials used to students of university. It is also as the factor that determines the effectiveness of the teaching and learning process.

Teaching HOTS is not a simple task to do because the students should learn to enhance skills in analyzing, evaluating and thinking creatively. Thus, teachers should be well equipped with the skills to teach HOTS, in order to play their roles to decrease the emergence of students who are passive learners and lacking problem-solving skills which at present is elevated as a remarkable concern among various stakeholders. Teachers need to be well informed and equipped well with their knowledge on what is higher order thinking skills and what does teaching these skills require. Besides this, teachers have to be well aware of all the pertinent techniques and strategies needed in teaching higher order thinking skills. From the fact indicates that teachers are faced with the problem of how to prepare and teach higher order thinking skills in education.

The teachers need to have competence in developing HOTS. However, teachers' ability in this field is still disappointed. The implementation of higher order thinking for teaching and learning can be categorized into three themes. The themes are teachers‟ lack of knowledge, insufficient materials and resources and finally teaching approaches and strategies. The importance of teaching higher order thinking skills effectively as a matter of fulfilling a national aspiration in education is upon the shoulders of teachers. However, findings showed that two-thirds of teachers are still low-level users of HOTs for teaching and learning in their classrooms. [8]

Aside from HOT skills, students face their own challenges as a result of the digital industrial revolution (society 5.0 and Industrial revolution 4.0). The digital revolution has reached its apex with the birth of digital technology, which has had a massive impact on human life all over the world. The fourth industrial revolution, also known as the fourth industrial revolution, encourages the use of automation systems in all process activities. As internet technology advances, it has not only connected millions of people around the world, but it has also become the foundation for online trade and transportation transactions. Of course, this phenomenon has an impact on the education sector, where a lecturer must consider technology-based learning, such as the purchase of e-books or e-modules in learning.

Technology makes the learning become interesting, because it can bring the students to enjoy their world. For example, the students can learn from the video, pictures, audio that served by the technology via internet, social media, game and etc. In English class, the students were enjoy and fun when the lecturer served the materials in form audio and visual that derived from the internet or technology. In addition the materials brings to the class also derive from the students surrounding, so it can make the students familiar with the topic and it makes them can participate in each discussion. The other advantage if the source is from the technology is make easy to get the materials from many sources in internet. The teacher can adopt or adapt the interesting materials in many sources

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and bring the class to the good condition. 21st century teachers should ideally be able to integrate literacy information and communication technology (ICT) and life learning. Teacher must have knowledge of technology; knowledge of pedagogy; and knowledge of content. [9] The class will become interesting class because all the members are active in teaching and learning process. Independent learning modules, multimedia, simulations, and video tutorials are examples of digital learning technology that can help students learn more independently. [10]

In the digital era, the advancement of information technology and information stimulates the use of such equipment in many fields, including higher education at the university. Many researchers recognize mobile technology's usefulness and benefits in increasing students' thinking. The integration of technology elements in learning is cross-curricular, which means that every field of study can use technological advances to enhance students' understanding of the subject being studied. As such, these improvements should be a substance for students in particular, to explore technological advancements to be used in their education and to enhance the ability in creativity, innovation, and high order thinking skills. [11]

Therefore, the purpose of this study is to investigate the effectiveness of English teaching materials using technology to enhance higher order thinking skills for university students. It is hoped that the use of English teaching materials using technology can improve students' higher order thinking skills (HOTS).

## RESEARCH METHODS

A quantitative research method with a quasi-experimental design was used. The quasi experimental method for assessing students' higher order thinking skills (HOTS). The independent variable in the study was English teaching materials using technology accompanied by a concept map (X), while the dependent variable was higher order thinking skills (Y). The research employed a pretest-posttest control group design. Table 1 depicts the research design:

| Pretest | Treatment | Posttest |
|---|---|---|
| $0_1$ | $X_1$ | $0_2$ |
| $0_3$ | $X_2$ | $0_4$ |

Table 1. Pretest-posttest Control Group Design

Note:
$X_1$ : English teaching materials using technology
$X_2$ : Conventional English teaching materials
$0_1$ - $0_3$: Pretest
$0_2$ - $0_4$: Posttest

This study's population consisted of all first-year students at primary school teacher education study program Adzkia University 2021/2022. The research sample was divided into two classes using a cluster random sampling technique, with two classes chosen from a total of ten classes, one as an experimental class and the other as a control class. A total of 66 students who chosen randomly divided into two groups, experimental and control groups, with 35 students from each class. Experimental class was taught by English teaching materials using technology while control class was taught by using Conventional English teaching materials.

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The main goal of these activities was to determine the effects of English teaching materials that used technology on students' higher order thinking skills (HOTS). Both groups completed the study in six weeks. The following steps were taken in conducting this research: 1) administering a pretest to the experimental and control groups to assess the level of students' thinking prior to treatment, 2) teaching English using technology, and 3) administering a posttest to assess HOTS after treatment.

The instrument used in this study is the test. In this study, a test of 25 objective questions was used to assess students' higher order thinking skills. SPSS was used to analyze the test data quantitatively. The data was analyzed using descriptive analysis, analysis prerequisite tests, and hypothesis testing. Normality and homogeneity tests were among the prerequisites for data analysis. At a significance level of 0.05, the Kolmogorov-Smirnov test was used to determine normality. In the homogeneity test, the Levene test was used with a significance level of 0.05. The hypothesis tests and statistical analysis of t-test in a significance level of 0.05.

## RESULTS AND DISCUSSION

The purpose of this study is to look into the impact of English teaching materials that use technology on students' higher order thinking skills. Before beginning treatment, the experimental and control classes were given a pretest to assess their cognitive ability. The difficulty level of the questions is the same. The average pretest scores for both groups are shown below.

| No | Class | N | Avarage scores |
|---|---|---|---|
| 1 | Eksperimental | 33 | 50.18 |
| 2 | Control | 33 | 45.09 |

Table 2. Pretest Average Score

After the pretest, each group received a different treatment for four weeks. Students in the control group learn English using conventional English teaching materials. Meanwhile, the experimental class was taught using English teaching materials and technology as a teaching medium, with the same topics presented as in the control class. Students in each class were asked to form groups to discuss the questions posed about the topic of each media used. Higher order thinking skills (HOTS) such as analyzing, evaluating, and creating were measured by the questions.

The last step, the posttest was given to both of the groups to investigate the effect of the media toward students' thinking ability. The questions in the test were same for both classes. The average scores of both groups were presented as below:

| No | Class | N | Avarage scores |
|---|---|---|---|
| 1 | Eksperimental | 33 | 84.58 |
| 2 | Control | 33 | 73.88 |

Table 3. Posttest Average Score

According to data table 3, both classes' posttest scores increased significantly. The researcher then used normality, homogeneity, and the t-test to test hypotheses. The normality test data is presented below:

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**Tests of Normality**

| | Class | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|---|
| | | Statistic | Df | Sig. | Statistic | df | Sig. |
| Result | Pre_Eks | .124 | 33 | .200* | .955 | 33 | .191 |
| | Post_Eks | .112 | 33 | .200* | .967 | 33 | .395 |
| | Pre_contrl | .115 | 33 | .200* | .964 | 33 | .343 |
| | Post_contrl | .097 | 33 | .200* | .981 | 33 | .802 |

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 4. Test of Normality

According to the table above, the control class's pretest and posttest have a significance level of 0.200 or greater than 0.05. The data is said to be normally distributed. The significance value for the experimental class pretest and posttest data was 0.200 or greater than 0.05. It means that the data is normally distributed. It is concluded that the obtained data are normally distributed.

In addition, the data of homogeneity tests are shown as below:

**Test of Homogeneity of Variances**

Result

| Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|
| 2.070 | 1 | 64 | .155 |

Table 5. Significance Value of Pretest

**Test of Homogeneity of Variances**

Result

| Levene Statistic | df1 | df2 | Sig. |
|---|---|---|---|
| .550 | 1 | 64 | .461 |

Table 6. Significance Value of Posttest

According to tables 5 and 6, the significance value for the homogeneity test in the experimental and control classes in the pretest is 0.155, and the significance value in the experimental and control classes in the posttest is 0.461. The significance levels are all greater than 0.05. It indicates that the population has homogeneous variants or that the data was derived from populations with the same variant.

In addition, the data from t-test analysis as follow:

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| Result | Equal variances assumed | .550 | .461 | 6.248 | 64 | .000 | 10.697 | 1.712 | 7.277 | 14.117 |
| | Equal variances not assumes | | | 6.248 | 62.952 | .000 | 10.697 | 1.712 | 7.275 | 14.118 |

Table 7. Independent Samples Test

Based on the data presented above, the significance value of the posttest is 0.000, implying that Ha is accepted and Ho is rejected. It denotes that there is a significant difference in post-test scores between the experimental and control groups. As a result, it can be concluded that English teaching materials that use technology have a positive impact on students' higher order thinking skills. It means that the students who were taught with English teaching materials using technology were better than students who were taught with conventional English teaching materials.

According to the findings, the mean score of higher order thinking skills of students in the experimental class who were taught with English teaching materials using technology was higher

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than the mean score of higher order thinking skills of students in the control class who were taught with conventional English teaching materials. It could be attributed to the use of technology in the materials, which piqued the students' interest and provided numerous opportunities for them to discuss and express numerous ideas in their group discussions when they had discussed the certain topic. Furthermore, the result explained that English teaching materials using technology gave significant effect toward students' thinking ability than using a conventional English teaching materials. This finding was in line with several theories and finding from previous studies by several experts.

One of the previous finding is derived from research conducted by [12], with the title "Development of Digital Book in Enhancing Students' Higher Order Thinking Skill." The results of data analysis indicate that this book is in a valid and practical category. The book is very effective to be used to enhance student HOTS. This Finding supported by [13], their study was about Enhancing Students Higher Order Thinking Skill through Instagram based Flipped Classroom Learning Model.' The purpose of this study is to demonstrate how Instagram-based flipped classroom models can help students improve their higher-order thinking skills when working with buffer solution resources. The findings revealed that on average, students' activities at home are exceptional, while their activities in class are good. This suggests that after using an Instagram-based flipped classroom learning model, students' higher-order thinking skills have improved.

Then, the study was done by [14], with the tittle: 'Students' Academic Use of Mobile Technology and Higher- Order Thinking Skills: The Role of Active Engagement'. The purpose of this research is to look at the link between college students' academic use of mobile technology and higher order thinking skills, as measured by active engagement and learning effort. The findings imply that, in addition to learning effort and active engagement in classes, academic use of mobile technology has a direct impact on students' higher-order thinking skills. These findings are useful for higher education institutions looking to implement interactive and technology-enhanced learning environments.

The types of media used by the teacher in the control and experimental classes differ in their implementations of teaching and learning methods. The teacher in the experimental class used English teaching materials using technology. The teacher in the control class used conventional English teaching materials. Based on the results of the pre- and post-test data, as well as observations of activities during learning, it can be stated that employing technology in English teaching materials can increase students' higher order thinking skills at Adzkia University. This is due to the materials being used in a way that makes students more motivated and enthusiastic about studying. In the era of education 4.0, ICT is a global demand, as are 21st-century skills. In addition to technology-based abilities, 21st-century talents necessitate learning through the development of HOTS [15].

## CONCLUSION

This study was conducted to investigate the effect of English teaching materials using technology toward the students' higher order thinking skills. Based on the results of the study, it is found that students who are taught by English teaching materials using technology have better higher order thinking skills than the students who are taught by using conventional English teaching materials. It can be concluded that English teaching materials is effective media to enhance higher order thinking skills (HOTS).

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