



On Gamification and Students' Reading Ability in Vocational High School

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Abstrak

Konektivitas jaringan, interaksi komunikasi, dan teknologi menjadi kenikmatan bagi generasi digital. Penerapan teknologi salah satunya media pembelajaran merupakan hal yang menarik dalam dunia pendidikan khususnya pengajaran membaca. Penelitian ini bertujuan untuk mengetahui sejauh mana pengaruh gamifikasi terhadap kemampuan membaca siswa. Metode dalam penelitian ini adalah penelitian eksperimen semu dengan menerapkan *pre-test and post-test nonequivalent group design*. Pada kelas eksperimen dalam penelitian ini siswa diberi perlakuan menggunakan gamifikasi, sedangkan kelas kontrol tidak diberi perlakuan. Ada 36 siswa kelas XI di SMK Methodist Tanjung Morawa yang menjadi populasi. Untuk menentukan sampel, peneliti menggunakan cluster sampling. 24 siswa menjadi sampel di kelas Eksperimen dan 12 siswa di kelas kontrol. Pretest dan posttest digunakan sebagai instrumen untuk mengumpulkan data dan nilai tes dianalisis dengan menggunakan IBM SPSS Statistics 20. Hasil uji t menunjukkan $t_{(tes >)} t_{(tabel)}$ ($3.334 > 1.694$) dan rata-rata nilai kemampuan membaca siswa yang menggunakan gamifikasi meningkat secara signifikan. Oleh karena itu, gamifikasi direkomendasikan sebagai salah satu media yang menarik dalam pembelajaran yang efisien dalam meningkatkan kemampuan membaca siswa.

Kata Kunci: gamifikasi, kemampuan membaca, sekolah menengah kejuruan.

Abstract

Network connectivity, communication interaction, and technology enjoyment are the consumption of the digital generation. The application of learning media is interesting in the world of educational teaching especially in teaching reading. The objective of this research is to investigate the effect of gamification on students' reading ability. This research implemented quasi-experiment method with *pre-test and post-test nonequivalent group design*. In the experimental class, the students were taught using the gamification, while the control class was by conventional method. The researchers used cluster sampling where 24 students became the sample in experiment class and 12 students in control class respectively. The pretest and posttest were used as an instrument to collect data and the test scores were analyzed using IBM SPSS Statistics 20. The results of independent t test showed the $t_{test} > t_{table}$ ($3.334 > 1.694$) and the average reading ability value of students taught using the gamification increased significantly. Therefore, gamification was recommended as one of the interesting efficient learning media in rectifying students' reading ability.

Keywords: gamification, reading ability, vocational high school.

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INTRODUCTION

The development of information communication technology is very rapid in today's 21st century learning, forcing every young generation to have the ability to read if they don't want to be crushed by the times. Reading ability has a role and is one of the keys to success in a person's life, since any information and knowledge obtained cannot be separated from reading activities. Reading ability increases creativity, gives us experience, and knowledge thus everyone living in this era can compete internationally (Shara, Andriani, Ningsih, & Kisno, 2020; Andriani, Ningsih, Shara, & Kisno, 2022). To achieve the students' reading ability, the application of reading literacy must be done as early as possible since reading ability is very important in develop the quality of human life, such as in communication, the educational process, adding knowledge, and even improving Human Resources (HR). The development of reading ability is an important element in the progress human resources of a nation today (Li & Chu, 2021). The initiator of the Reading Literacy Movement needs to have an awareness of the importance of mastering of reading literacy from an early age, by all parties if they want to improve human resources. Good reading ability can be used as the main step in improving the progress of a country's human resources.

Unfortunately, reading ability in Indonesia is very low and concerning. According to UNESCO data, the reading ability of the Indonesian people is incredibly concerning, only 0.001% (Wandasari, Kristiawan, & Arafat, 2019). That implies that out of 1,000 Indonesians, only 1 person has the ability to read as expected.. Therefore, the reading ability of Indonesian students is still very low, thus it is very doubtful that human resources can increase and the younger generation can compete internationally. Based on PISA and PIRLS data, the reading ability of Indonesian students is in the lowest rank. Where is Indonesia ranks 60th out of 61 survey participating countries in terms of reading literacy ability (Damaianti, Abidin, & Rahma, 2020). To tackle this problem requires an innovative strategy to create a literate and advanced Indonesia. According to (Tahmidaten & Krismanto, 2020), It cannot be separated from the quality of teachers, the methods used by teachers, media, techniques, etc. However, gamification comes with the hope of increasing student ability in reading.

Gamification is the use of game design techniques, game thinking and game mechanics to enhance non game contexts. Gamification usually applies to non gaming applications and processes, to encourage people to adopt them, or to influence how they are used (R.Sancheza, Langerb, & Kaur, 2020).

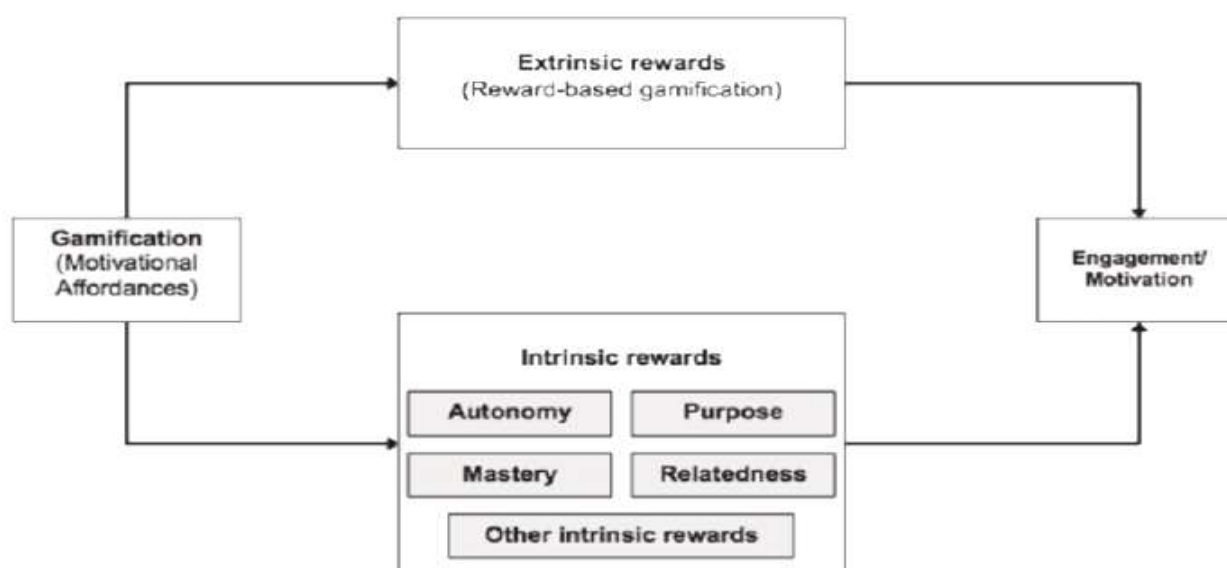


Figure 1: effect of gamification on motivation and engagement (Hassan, 2017)

From Figure 1 above it is very clear, that gamification (motivational) affordances have two impacts. They are extrinsic rewards and intrinsic rewards. Both impacts achieve engagement/motivation and when intrinsically motivated, a person is moved to act for the fun or challenge entailed rather than because of external pressures or rewards. Intrinsic motivation is a natural inclination towards exploration, mastery and spontaneous interest that benefits persistence, performance and wellbeing.

When implementing gamification, it can help student to master new skills and achieve greater success because these activities are meaningful and related to activities that are fun and effective. Gamification plays an important role in improving students' reading ability which shows varying degrees of positive impact on the overall experience of learners, such as increasing motivation and reading engagement (Alsawaier, 2018). Therefore, to improve students' motivation and reading ability, it is necessary to develop various creative and innovative learning models. This matter needs to be done so that the reading process is not seems less attractive, monotonous and boring so it will hinder the transfer of knowledge. Therefore the role of gamification in improving students' reading skills important because being able to fail without consequences (indeed, failure is expected) and try again, learning more with each failure until 'leveling up' or reaching their reward (Rapp, Hopfgartner, Hamari, Linehan, & Cena, 2019). The reasons learning to fail is important for children as well as for adults. With gamification, children can fail without consequence (indeed, failure is expected) and try again, learning more with every fail until the 'level up' or reach their reward. In time, skills increase and tough tasks don't seem so difficult after all. When applying Gamification, lets students have more control over their learning, gives kids the freedom to fail and try again without negative consequences, makes learning more fun and memorable, gives students manageable tasks that enhance confidence, inspires children to learn, offers alternatives to traditional teaching styles. Educators and all educational participants must make changes in solving challenges in the reading process to achieve reading ability (Lim & Jung, 2019).

The study is confined to the eleventh-grade students in SMK Swasta Methodist Tanjung Morawa, in the first semester of the academic year 2021/2022. The learning process in English subject used of game mechanics, aesthetics and game thinking to engage students and stimulate their activities, and also to promote learning and problem solving. In this research is to introduce gamification elements through the wordwall.net. Points and leader board are awarded to students afterwards they complete assigned reading activities. Reading skills will become one of the benchmarks tested in implementation of the National Assessment. Therefore, implementing gamification in the form of the wordwall.net is a good solution.

Wordwall is a type of gamification that provides various game templates that can be adjusted to your needs. There are many types of games offered by the wordwall application, namely match up, quiz, matching pairs, open the box, find the match, missing word, game show quiz, maze chase and many more. Through Wordwall, teachers can develop their pedagogical creativity in teaching (Harmon, Wood, & Kiser, 2015). One of the efforts that teachers can do is to package materials or tasks that are usually given to students to be more recreational through this application. When using the wordwall application, students do not only play games but while learning material or doing assignments from the teacher (Mariati, 2019). Students' reading ability will increase by using word wall because it encourages students to be active and Wordwall supports student ongoing learning (Rachmawaty, 2017). The problem of the material or task in this gamification is expected to be able to overcome the boredom and disinterest of students in reading.

Research on gamification has been done by other researchers, but its application is in children with autism and elementary schools. One of them is a researcher in Northeast Taiwan about a web based collaborative reading annotation system with gamification mechanisms to improve reading performance (Chen, Li, & Chen, 2020) however there is not any preliminary research about a different way of solving problems using gamification in Vocational school. Therefore, this research on gamification may be an opportunity to engage a new generation of readers. It is expected that gamification can help students master

new skills and achieve greater success because the activity is meaningful and linked to activities that are fun and effective. The purpose of this research is to find out the extent of the effect of gamification on students' reading ability. The significance of this study is beneficial to readers especially educators and education participants to improve their reading skills through the application of gamification so that they can maintain their attention and increase their concentration while reading.

METHOD

This study implemented a quantitative research method. Quantitative research methods are systematic, structured research methods and data analysis use numbers and measurements. The data in quantitative research are a set of numbers by using statistical or mathematical analysis and the results are often presented in tables and graphs (Faems, 2020). This study was designed as a quasi experimental research with implemented pretest posttest nonequivalent group design. Pretest-posttest Nonequivalent-group design compared scores before and after treatment in the group that received the treatment and the group that did not (Krisbiantoro, 2021). It was chosen because this study aimed to know to what extent Gamification affects the student's reading ability.

Table 1. Research Design Pretest Posttest Control Group Design

Group	Pre-Test	Treatment	Post-Test
E	Q1	X	Q2
C	Q3	-	Q4

(Source: Hasanah, Suryana, & Nugraha, 2018)

Explanation:

E: The experimental group (the group that is given with the treatment)

C: The control group (the group that is not treated with the treatment)

Q1: pretest experimental group

Q2: posttest experimental group

Q3: pretest control group

Q4: posttest control group

X: The use of gamification.

This study was conducted at SMK Methodist Tanjung Morawa in grade XI, both Network Computer Engineering and Business Management concentration. The reason of the researchers selected grade XI because this grade was the ideal study population which the researcher adjusted to the research topic of gamification and student's reading ability but most importantly this grade will face Minimum Competency Assessment. There were 36 students involved in this research. In collecting the data, the researchers used instrument for the reading comprehension test in the form multiple choice to adjust the application between the standard in wordwall.net. The topics that the researcher used in these Pre-test and Post-test research were taken from the book "English Books for Semester II grade XI SMA/SMK". Respondents from the experimental group (E) will be tested before to check their previous performance before implementing the treatment learning program. Experimental group was directed to read text with gamification.

The overview of what the Experiment group (E) should do:

- The researcher introduced gamification strategy to the students and clarified its use through WhatsApp group.
- Furthermore, after the students in group E understood, the researcher shared the pre test. The researcher asked students to log in to the wordwall.net, through the link that had been set by the researcher.

- c. Then, Experimental Groups submitted their pretest results, and they can immediately see the leader board.
- d. Students or group E logged in to the different link, <http://wordwall.net> that researcher had provided.
- e. The researcher shared the post test link on a different day. The researchers encouraged students to complete and submit their answers within the time specified on the website. All students could see the points who participate in the class through the leader board.

The overview of what the Control group (C) should do:

- a. First, the researcher shared the soft copy of the pre test with group C.
- b. Then, group C submitted the results of the pretest directly to the researcher.
- c. Then the researcher send the post test on a different day.
- d. Researcher asked the students to take photos of their test results and immediately sent them to the researcher's WhatsApp directly.

Reading worksheet was used as data collection instrument. This worksheet was designed and converted to <https://wordwall.net> so that students can access it anywhere and relatively easy. The test consists of 10 items covering 4 reading skills as can be seen in Table 2.

Table 2. Test Blue Print for Grade Eleventh

Test Component	Objectives	Topics	Test Type	Easy	Medium	Difficult	Nb. Of Test Item	Durations (Minutes)
Reading Comprehension	To measure the student's comprehension about the topics given through the http://wordwall.net .	recognize the structure of personal letters finding morals and life lessons from a folklore recognize sentences that contain opinions from a text recognize elements of a speech text	Multiple Choice	5	3	2	10	30

finding the
purpose of
an
invitation
text

RESULT AND DISCUSSION

Result

a. Validity and Reliability

Validity test is a process to test the accuracy of the instruments used by researchers to collect data. Instruments are said to be valid if they meet the requirements. In this case, there are 10 questions was provided by researcher in the form of multiple choices as an instrument to be distributed to 34 respondents. To calculate the validity of the questions, researcher used the Biserial Correlation formula on Ms. Excel. The validity score of 10 multiple choice questions used r table with a significance level of 5%, then the r table suitable for 34 respondents was 0.278. The item is valid if r count is greater than r table ($r \text{ count} > r \text{ table}$). The results of the validity of the multiple choice tests are shown in Table 3. Table 3 below shows the calculations of the validity of multiple-choice test using Ms. Excel where the coefficient of all r count are greater than r table (0.278). From these results, it means that all the questions in the multiple choice test used in this research are valid.

Table 3. Validity of Multiple Choice Test

Number of Items	r count	r table	Result
1	0.844	0.278	Valid
2	0.342	0.278	Valid
3	0.522	0.278	Valid
4	0.896	0.278	Valid
5	0.822	0.278	Valid
6	0.781	0.278	Valid
7	0.659	0.278	Valid
8	0.402	0.278	Valid
9	0.704	0.278	Valid
10	0.570	0.278	Valid

A reliability test was used to determine the consistency of the instrument responses. Good instrument or test have relatively the same or consistent results when distributed to different respondents at different times. The researcher used the formula KR-20 to measure the reliability of the test. The test reliability value between 0.70 and 0.90 or closer to 1 indicates high reliability. The results of the reliability calculation on 10 items obtained a reliability value of 0.858, so it can be concluded that all the questions in this study are reliable as is shown in Figure 2.

Σ	22	21	24	23	23	24	19	26	26	27	RELIABILITY
p	0.647	0.618	0.706	0.676	0.676	0.706	0.559	0.765	0.765	0.794	
q	0.353	0.382	0.294	0.324	0.324	0.294	0.441	0.235	0.235	0.206	
pq	0.228	0.236	0.208	0.219	0.219	0.208	0.247	0.180	0.180	0.163	
Σpq	2.087										
var.score	9.174										
KR-20	0.858	RELIABILITY COEFFICIENT IS VERY HIGH									

Figure 2: reliability test

b. Hypothesis Requirements Test

1. Normality Test

Normality test aims to test data that obtained from each variable normally distributed or not. Good data is, have normal data distribution. The calculation of the normality test in this study uses the normality test Shapiro-Wilk using IBM SPSS Statistics 20. The basis for the decision is if the statistical probability value > Level of Significant = 0.05, then the assumption is normality.

Table 4. Normality Test Results

Group		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Result1	Pre_E	.176	24	.052	.919	24	.055
	Post_E	.176	24	.052	.919	24	.055
	Pre_C	.178	10	.200*	.907	10	.258
	Post_C	.233	10	.133	.904	10	.245

Based on the results of the normality test with Shapiro-Wilk Test above shows that the probability value of t-statistics > Level of Significant = 0.05, then the data meet the assumption of normality. Thus, then data that obtained from each variable has a normal distribution.

2. Homogeneity Test

To measure the homogeneity of variance of the two data classes, the F test formula is used as follow:

$$F = \frac{\text{Biggest Variant}}{\text{Biggest Variant}}$$

Homogeneity test was applied to the post-test result data from the experimental class and the control class. This test was used as prerequisite in the analysis of the Paired Sample T Test. The data obtained were declared homogeneous if the Sig. Based on Mean > α = 0.05. The results of the homogeneity test of this study are as follows:

Table 5. Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Result	Based on Mean	.011	1	32	.916
	Based on Median	.001	1	32	.971
	Based on Median and with adjusted df	.001	1	30.282	.971
	Based on trimmed mean	.013	1	32	.911

Based on the results of the homogeneity test, the value of Sig. Based on Mean ≥ 0.05 , then the data meet the assumption of homogeneity. Thus, the data that has been obtained have similarities.

c. Hypothesis Testing

A hypothesis is a temporary answer to a problem that has been formulated. Therefore, hypothesis must be tested or proven empirically in a scientific work. In this study, it turned out that they were tested for reading skills. Of this variety, the hypothesis formula in this study is divided into H_a and H_0 , as below:

1. H_a : Using online game kahoot significantly affects student's reading ability in Vocational school.
2. H_0 : Using online game kahoot does not significantly affect student's reading ability in Vocational school.

Based on the research hypothesis formula above, the statistical hypothesis formula is in this research is as follows:

H_a : If the $t_{\text{test}} > t_{\text{table}}$ = Alternative hypothesis is accepted

H_0 : If the $t_{\text{test}} < t_{\text{table}}$ = Null hypothesis is accepted

To determine the effect of media online game kahoot on students' reading ability in tenth grade at SMK GKPS 2 Pematangsiantar, the researcher will use a t-test. All t-test calculations will be calculated using IBM SPSS Statistical 20. The results of the calculation of the pre-test test and the post-test of this research can be seen in Table 6.

Table 6. Independent Samples Test

		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	.011	.916	3.334	32	.002	12.750	3.824	4.961	20.539
	Equal variances not assumed			3.433	18.046	.003	12.750	3.714	4.948	20.552

Having used IBM SPSS Statistical 20 for analyzing the data, based on the table above, it is showed that the result of the independent samples t-test from the experiment and control class is 3.334. The table also showed that the degree of freedom (df) is 32. The value level of significance in this study is 0.05 (5%). It means t_{table} at df 32 at 0.05 the level significant is 1.694. Based on the result of hypothesis test calculation, it was found that the $t_{\text{test}} > t_{\text{table}}$ ($3.334 > 1.694$). It meant H_a was accepted and H_0 was rejected. This means that there was a significant difference between the score of the experimental group and the control group as was shown on the table above. So that it can be concluded that there was an increase in learning outcomes for the Experiment and control classes from pre-test to post-test, although the increase in the control class was not too significant.

Discussion

Based on the research analysis the use of gamification affects reading ability. Reading ability is crucial in today's world. A new issue in today's reading world was that reading can not only read and answer post-reading questions, but captures the author's ideas and turns them into other useful things such as sharing reviews and crystallizing ideas after reading into meaningful and positive actions (Kisno, 2020). Knowing how important reading skills were in today's world requires skill upgrading in the field. An important role as educators in this field is needed, teachers are required to be creative in finding solutions to improve reading skills, both methods, media, approaches, techniques, etc (Drajati, et al., 2018). One way for teachers to achieve this is by optimizing the use of technology as a means of education which is expected to produce better output in the 5.0 era.

The online Kahoot game was found by Johan Brand, Jamie Brooker and Morten Versvik with the Norwegian University of Science and Technology 2012 which can motivate students to improve their reading ability (Putri, 2019). Gamification was an educational game designed to arouse students' interest in learning to understand the subject while playing, so that feelings of joy, joy and not boredom appear (Korkmaz & Huseyin, 2021). In order for students to be motivated and easy to understand lessons taught by educators. In addition, students can easily access kahoot online gaming through smart phones, tablets, laptops and other devices.

Based on research finding results from the application of the gamification by researcher in English subject at SMK Swasta Methodist Tanjung Morawa variable independent significantly affects variable dependent. It can be seen based on the output of independent samples t-test that the t-test was greater than t-table ($t_{\text{test}} > t_{\text{table}}$ ($3.334 > 1.694$)). It can be concluded that there was an average difference for the pretest and posttest on the experimental class using the gamification was compared with the pretest and posttest in the control class. Thus, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted, namely "There is a significant effect on the use of gamification on student's reading ability in grade eleventh at SMK Methodist Tanjung Morawa academic year 2021/2022". Thus, it can be concluded that the use of online gamification has positives for teachers to apply in increasing students' reading ability.

CONCLUSION

Based on the results the analysis of the effect of gamification on the students' reading ability in grade eleventh at SMK Swasta Methodist Tanjung Morawa it can be concluded that the application gamification affects the students's reading ability. Therefore, gamification media is recommended to solve the problem of the low reading motivation and engagement of the students. This study has its implication that the gamified reading platform benefits active users in terms of reading interest, motivation, habits, and skills. When users' intrinsic drive for learning is stimulated, the impacts of gamification pedagogy can be long-lasting.

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