

The Influence of Using Ludo Kimia Game as Chemo-Edutainment Media for Redox Reaction Materials and Compound Nomenclature on Learning Outcomes of MA Students

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Abstract — Learning media in the form of games is a game tool that is educational and fun, so that it can involve active and competitive students. Judging from its advantages, learning media in the form of games can help students learn in groups, can foster a competitive spirit, and can prevent boredom experienced by students so that the learning process is not rigid but will be fun. This study aims to reveal the effect of using the chemical ludo game as a Chemo-edutainment media redox reaction material and compound nomenclature on the learning outcomes of class X MAN 2 Padang students. The type of research used is a quasi-experimental with Post-test Only Control Group Design. The sampling technique used was purposive sampling technique. The population in this study were all students of class X science at MAN 2 Padang in the even semester of the 2020/2021 academic year. The data analysis technique used is the Independent t-test obtained from the post-test. Based on the results of the study, it was found that there was a significant effect on the use of chemical ludo games as a Chemo-edutainment medium for redox reaction materials and nomenclature of compounds on the learning outcomes of students in class X MAN 2 Padang. This can be seen from the difference in cognitive learning outcomes obtained by the experimental class (83.63) which is higher than the control class (78.13) and the t-test analysis which obtained a sig value of $0.006 < 0.05$. Furthermore, it is also supported by the percentage of learning completeness in the experimental class (87.5%) which is higher than the control class (81.25%).

Keywords —learning outcomes, chemical ludo and Chemo-Edutainment (CET).

I. INTRODUCTION

Chemistry subject is one of the subjects that must be studied in the 2013 revised 2018 curriculum. In chemistry subjects, students are expected to learn concepts and skills. One of the materials that must be studied in class X even semesters is redox reactions and compound nomenclature. These materials include dimensions of knowledge factual, conceptual, and procedural [1]. So that repetition is needed by reading a lot, discussing and consolidating concepts can be done by providing practice questions for students [2].

Based on the results of interviews with 2 chemistry teachers at MAN 2 Padang, it was found that in the learning process on redox reaction material and nomenclature of compounds the teacher used textbooks and power points as media in learning. It is also known that the exercises that the teacher provides are sourced from textbooks that have been provided at the school and are individual in nature. The exercises carried out did not fully involve active students in working on the practice questions. This causes low active participation of students when completing the exercise, which of course will affect learning outcomes and have an impact on

consolidating concepts. One of the efforts made to increase the active participation of students in completing the exercise is by providing varied exercises such as games. By playing, students can discover and learn new things or skills. Through playing, students will be trained physically and cognitive abilities and interaction skills with others people will develop [3].

Games as learning media will lead to active participation of students in learning [4]. Through learning media in the form of games, it is hoped that students will be more interested and active during learning, and spend more time learning.

Various exercises can make it easier for students to solidify a concept. Games as Chemo-edutainment (CET) media are one of the variations of exercise that can be used. The game as a CET medium is an exercise that aims to make students interested in working on practice questions. Students are required to think in doing practice questions, as well as in solving practice questions, students are expected to have a competitive spirit in order to win the games provided. This is able to increase the active role and motivation of students in working on practice questions [5]. Based on the results of relevant research learning media in the form of games, it was found that the use of snakes and ladder game as a CET medium can achieve knowledge competency completeness of 87.87% on the material periodic system of elements in class X SMAN 2 Tanah Putih [6]. Furthermore, the use of the Teams Games Tournaments method with the aid of crossword puzzles and snakes and ladders has a significant effect on student learning outcomes on colloidal material in class XI of SMAN 1 Simo as evidenced by a significant value ($p < 0.05$) [7]. Likewise, the use of chemical snakes and ladders game on psychotropic materials and additives has a significant effect on learning outcomes, which obtained an average value of 83.73 in the experimental class and 76.80 in the control class [8]. Based on this description, currently available learning media in the form of games for practice, namely in the form of chemical ludo games as Chemo-edutainment media on redox reaction materials and compound nomenclature [9]. This media has been tested for its validity and practicality, but its effect on learning outcomes has not been carried out.

II. METHOD

The type of research used in this study was a Quasy Experimental Research. The research design used was Post-test Only Control Group Design. The following is the Post-test Only Control Group Design which is presented in Table 1:

Table 1 . Post-test Only Control Group Research Design

Class	Treatment	Post-test
Experiment	X	Y
Control	-	Y

Information :

X : The treatment given to the experimental class using the chemical ludo game media .

Y : Giving post-test to the experimental class and the control class

The population in this study were all students of class X IPA 1 - X IPA 7 at MAN 2 Padang in the even semester of the 2020/2021 academic year. Grade samples were taken by using the technique of sampling purposive. Sampling with this technique is based on certain considerations [10]. It was found that class X IPA 3 as an experimental class was treated using chemical ludo game media and class X IPA 1 as a control class that was not treated using chemical ludo game media.

The variables used in this study are independent variables, dependent variables and control variables. a). The independent variable, namely the variables that affect or actually cause variable dependent. In this study, the independent variable was the provision of training using the chemical ludo game in the experimental class and the provision of ordinary exercises in the control class. b). The dependent variable is the variable that is affected or the result, because of the independent variable. In this study, the dependent variable is student learning outcomes obtained from the post-test results in the experimental class and control class. c). Control variables, namely variables that are controlled or made constant so that the influence of the independent variable on the dependent variable is not influenced by external factors that are not examined. In this study, the control variables were textbooks, time allocation, curriculum, and subjects.

III. RESULTS AND DISCUSSION

3.1 Results

The final test (Post-test) is given at the end of the learning process which aims to determine the learning outcomes of students after being given treatment. In summary, the results of the average post-test scores of students in the experimental class and control class are Presented in Table 2.

Table 2. Average Post-Test Scores For The Experimental Class and The Control Class

Class	Number of Students	Post-test Average
Control	32	78.13
Experiment	32	83.63

In Table 2, the average post-test score for the experimental class is 83.63 and the control class is 78.13. This is because in consolidating concepts in the experimental class, students work on practice questions in the Ludo chemistry game as Chemo-edutainment media so that students participate and are motivated in learning. By using the game each student will compete to win the game so that students are actively involved in the training process [11]. In contrast to the control class, in consolidating the concept, students do not do exercises in the form of a chemical ludo game as a Chemo-edutainment medium and are not used properly because generally students do not participate less when faced with questions that do not vary.

The truth of the research data can be tested with normality test, homogeneity test and hypothesis testing. Percentage mastery learning is used to determine what percentage of learners who can reach values above the minimum completeness criteria (KKM).

3.1.1 Normality Test

Normality test using Kolmogorov Smirnov test (K-S test). The data is said to be normal if the sig score > 0.05 . In summary, the results of the normality test for the experimental class and the control class are presented in Table 3.

Table 3. Post-test Normality Test Results for Experiment Class and Control Class

Class	N	Sig	α	Information
Control	32	0.145	0.05	Normal Distributed
Experiment	32	0.201		

Table 3 shows that the value Sig control class and experimental class > 0.05 on tare f real $\alpha = 0.05$. This shows that the learning outcomes of the experimental class and control class are normally distributed.

3.1.2 Homogeneity Test

Decision-making on the homogeneity test is seen from the significance value of the levenge statistic, if it is greater than (0.05) then the data is classified as homogeneous variance. The results of the post- test homogeneity test for the experimental class and the control class are presented in Table 4.

Table 4. Results of Post-test Homogeneity Test Experiment Class and Control Class

Class	N	S ²	Sig	α	Information
Experiment	32	69,828	0.951	0.05	Homogeneous
Control	32	81.371			

Table 4 shows that the experimental class and the control class has a value Sig > 0.05 at significance level $\alpha = 0.05$. This means that the post-test results in the experimental class and control class have homogeneous variance.

3.1.3 Hypothesis Testing

Based on the results of the analysis of the normality test and the analysis of the homogeneity test, it was found that the learning outcomes data from the experimental class and control class were normally distributed and had homogeneous variance. Therefore, to test the hypothesis, the Independent t-test (t-test) was carried out. Test Results of hypothesis testing on the learning outcomes of the experiment class and control class are presented in Table 5.

Table 5. Results of Hypothesis Testing on Learning Outcomes of Experiment Class and Control Class

Class	N	$\bar{X}$	Sig	α
Control	32	78.13	0.006	0.05
Experiment	32	83.62		

In Table 5 obtained by the Sig second grade sample <0.05 , then H_1 accepted. This shows that there are differences in learning outcomes for the experimental class and the control class. Where the result of learning of students who use the game ludo chemistry as media Chemo-edutainment higher significantly compared with the study of students without using the media game ludo chemical on the material of redox reactions and nomenclature of compounds.

3.1.4 Percentage of Mastery Learning

Differences in student learning outcomes in the experimental class and control class can also be seen from the percentage of complete learning. The percentage of completeness is used to determine the mastery of students' learning outcomes in the experimental class and control class on the use of chemical ludo game media as Chemo-edutainment media. Based on the minimum completeness criteria (KKM) at MAN 2 Padang, which is 75, so the percentage of learning completeness in the experimental class and control class is presented in Table 6.

Table 6. Percentage of Study Completeness in Experiment Class and Control Class

Class	Number of Participants Didik	Number of Completed Students	Percentage of Complete Learning	Number of Students are Not Completed	Percentage of Incomplete Learning
Control	32	26 people	81.25%	6 people	18.75 %
Experiment	32	28 people	87.5%	4 people	12.5 %

In Table 6, the percentage of learning completeness in the experimental class is 87.5% and the control class is 81.25% with a very good category.

3.2 Discussion

The provision of training in the form of a chemical ludo game in the experimental class was carried out at the VI meeting for approximately 60 minutes. This time limitation is adjusted to the existing time allocation and is carried out quite well, it is intended that students are not stuck with the game. To save time, the researcher also instructed the coordinator to show difficult-to-understand questions directly to the players. Because that way the player will not ask for the question to be repeated over and over again so that it can save time.

In the experimental class, the chemical game ludo game as a CET medium can help students in consolidating concepts in the material that has been taught. It can be seen that during the training process, students learn in pleasant conditions and are very enthusiastic in answering the existing practice questions, so that learning does not seem boring. This makes it easier for students to understand and remember more of the material presented. The greater the attention and involvement of students, the better students' understanding of the subject matter and of course will have an effect on satisfactory learning outcomes.

The effect of using media in the learning process can attract students to participate actively in the learning process, so that students' motivation and learning outcomes can increase [12]. The use of varied learning media appropriately can affect the activities, interests and learning motivation of students which of course will affect their learning achievement. In addition to arousing students' motivation and interest, learning media can also help increase understanding and condense information [13].

The use of the chemical ludo game as a Chemo-edutainment media makes students enthusiastic in learning and creates excitement. In the use of the chemical ludo game, students are invited to play while learning so that students are unconsciously involved in fun learning. One of the benefits of learning while playing is to invite students to be actively involved in the learning process [11].

Meanwhile, in the control class, the training was provided by using the textbook provided by the school. The time for giving practice questions is the same as giving exercises in the experimental class, which is approximately 60 minutes. When the implementation of the training process took place, it was seen that students were less active in completing the exercises, only a few people wanted to ask and answer questions, while the others were mostly embarrassed to ask questions and were afraid to answer wrongly. As a result, this control class was dominated by certain students during the training process. In conventional learning, students only act as passive recipients of information which ultimately makes students afraid and embarrassed in expressing their opinions [14].

At the end of the study, the two sample classes were then given a post-test, where the post-test average score for the experimental class was 83.63 and the control class was 78.13. It can be seen that the post-test value of the experimental class is higher than the value of the control class. This is because in consolidating the concept in the experimental class, most of the students participated actively and enthusiastically in working on the questions on the Ludo chemistry learning media. By playing, students can discover and learn new things or skills. Through playing, students will be trained physically and cognitive abilities and the ability to interact with others will develop [3].

Based on the description above, it is found that the use of Ludo Chemistry learning media as a Chemo-edutainment media can improve students' cognitive learning outcomes. The use of learning media can improve the learning outcomes achieved by students [15]. Because by using learning media in the form of games, students become more interested and active and motivated to learn [4]. The learning media of the chemical ludo game as Chemo-edutainment media on redox reaction material and the nomenclature of compounds has been in accordance with the characteristics of MA students. There are several specifics of adolescent social behavior, one of which is group pleasure [16].

The use of learning media in the form of a chemical ludo game can make students participate actively and be motivated to do the exercises. By using games, each student will compete with each other to win the game so that students are fully involved in the ongoing training process [11]. In addition, learning media in the form of chemical ludo games can make the learning atmosphere more fun. The advantage of game media compared to other media is that it can make learning more exciting and interesting [17]. Playing games can also have a positive impact on learning, including improvements in cognitive, motivational, emotional and social interactions [18]. In the use of chemical ludo game media as Chemo-edutainment media, the principles of learning the theory of cognitivism have been applied. According to this theory, knowledge comes from action, depending on how far students are active in learning activities. In the learning process, the dominant point is the formation of a cognitive structure as an effort to solve problems.

IV. CONCLUSION

Based on the results of research, data processing and data analysis that has been carried out, it can be concluded that the use of chemical ludo games as a Chemo-edutainment media has an effect on student learning outcomes. Retrieved h acyl learners who use the game ludo chemistry as media Chemo-edutainment significantly higher at the level of $\alpha = 0.05$ compared with the study of students without using the p ermainan ludo chemical redox reaction materials and compound the nomenclature of class X MAN 2 Padang.

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