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Differences in Motivation and Student Learning Outcomes Learned with Digital Snakes and Ladders Media on Chemical Bonding Materials at SMAN 5 Medan

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Abstract: Differences in Motivation and Student Learning Outcomes Learned with Digital Snakes and Ladders Media on Chemical Bonding Materials at SMAN 5 Medan. Research purposes This that is For know difference motivation and results Study students studied with snake media digital ladder on material bond chemistry as well as enhancement and correlation between motivation and results Study student . Study This is study quantitative . Deep sample study This taken purposive sampling of 2 classes i.e. X 11 as class experiments I and X 10 as class experiment II, where each class 30 students were taken based on similarity results pretest . Instruments used that is instrument test form question choice double as well as non- test instrument form sheet questionnaire motivation learn . Testing hypothesis done with using the SPSS Statistics version 24 for Windows computer program Independent Sample T-Test and Bivariate Pearson Correlation. For hypothesis I is obtained sig value . (2-tailed) 0.000< α(0.05) so that H $_a$ accepted , which means there is difference motivation Study students studied with snake media digital ladder . For hypothesis II is obtained mark sig. (2-tailed) 0.022< α(0.05) so that H $_a$ accepted , which means there is difference results Study students studied with snake media digital ladder . For hypothesis III is obtained enhancement motivation learn what is learned with snake media digital ladder by 40%. For hypothesis IV is obtained enhancement results learn what is learned with snake media the digital ladder is 76% in the category tall . For hypothesis V is obtained mark sig. (2-tailed) of 0,000< α(0.05) so that H $_a$ accepted , which means there is correlation between motivation learning and results Study students studied with snake media digital ladder on material bond chemistry .

Keywords : Digital Snakes and Ladders , Motivation Learning , Learning Results , Chemical Bonding

Abstrak: Perbedaan Motivasi dan Hasil Belajar Siswa yang Dibelajarkan dengan Media Ular Tangga Digital pada Materi Ikatan Kimia di SMAN 5 Medan*. Tujuan penelitian ini yaitu untuk mengetahui perbedaan motivasi dan hasil belajar siswa yang dibelajarkan dengan media ular tangga digital pada materi ikatan kimia serta peningkatan dan korelasi antara motivasi dan hasil belajar siswa. Penelitian ini merupakan penelitian kuantitatif. Sampel dalam penelitian ini diambil secara purposive sampling sebanyak 2 kelas yaitu X 11 sebagai kelas eksperimen I dan X 10 sebagai kelas eksperimen II, dimana masing-masing kelas diambil 30 orang siswa berdasarkan kesamaan hasil pretest. Instrumen yang digunakan yaitu instrumen tes berupa soal pilihan ganda serta instrumen non tes berupa lembar angket motivasi belajari. Pengujian hipotesis dilakukan dengan menggunakan program computer SPSS Statistic version 24 for*

Windows menggunakan Independent Sample T-Test dan Bivariate Pearson Correlation. Untuk hipotesis I diperoleh nilai sig. (2-tailed) 0,000 < α (0,05) sehingga H_a diterima, yang berarti terdapat perbedaan motivasi belajar siswa yang dibelajarkan dengan media ular tangga digital. Untuk hipotesis II diperoleh nilai sig. (2-tailed) 0,022 < α (0,05) sehingga H_a diterima, yang berarti terdapat perbedaan hasil belajar siswa yang dibelajarkan dengan media ular tangga digital. Untuk peningkatan motivasi belajar yang dibelajarkan dengan media ular tangga digital sebesar 40%. Untuk peningkatan hasil belajar yang dibelajarkan dengan media ular tangga digital sebesar 76% dikategori tinggi. Untuk hipotesis III diperoleh nilai sig. (2-tailed) sebesar 0,000 < α (0,05) sehingga H_a diterima, yang berarti terdapat korelasi antara motivasi belajar dan hasil belajar siswa yang dibelajarkan dengan media ular tangga digital pada materi ikatan kimia.

Kata Kunci: *Ular Tangga Digital, Motivasi Belajar, Hasil Belajar, Ikatan Kimia.*

▪ INTRODUCTION

Education is an effort to prepare oneself young generation in welcoming and facing developments era in the global era. So education must be carried out as well as possible as much as possible so as to produce quality education and improve the quality of human resources(Nurrita, 2018) .The development of the digital world in the world Education also has an influence significant impact on teacher and student interaction patterns. Students who have technological literacy good ones tend to get bored more quickly if learning runs conventionally (Sapriyah, 2019). In its implementation, a teacher is required to be able to use tools efficient technology in an effort to achieve the expected teaching goals. In learning, each material has a different level of difficulty.On the one hand there is learning material that does not require learning media, but on the other hand There are still other learning materials that require learning media (Ondartiwi et al, 2020).

Chemistry broadly describes the characteristics of substances that differ from one another, describes the conditions under which these substances interact, describes the properties and uses of the new substances produced and explains why these changes occur. The characteristics of chemistry are that the concepts presented are abstract, and in general the concepts are simplified from the actual situation, and the concepts in chemistry are presented in an interconnected and systematic manner. Based on these characteristics, it is very possible to make chemistry one of the academic subjects that is considered difficult by pupils and students (Suhardi & Yunita Susanti, 2020).

Based on the results of interviews with chemistry teachers at SMA Negeri 5 Medan, it was stated that student learning outcomes in chemistry subjects were still low. This is proven by only 40% of students who passed the KKTP in the daily test on chemical bonding material, where 60% of students did not meet the Learning Goal Achievement Criteria (KTTP) set at SMA Negeri 5 Medan, namely 78. Apart from interviews with chemistry study teachers based on As a result of observations at SMA Negeri 5 Medan, problems were found that occurred during the learning process. At school, teachers' learning activities use an approach that focuses on textbooks and knowledge transfer, which is dominated by lecture methods, giving assignments, using whiteboards and markers as well as occasionally using PowerPoint. This results in low student learning outcomes on chemical bond material, because students are busy with their own activities such as talking with their classmates and frequently going in and out of class. The difficulties experienced by students are also due to students' low motivation to learn chemistry, lack of desire and desire to succeed in learning, for example students are not

enthusiastic about doing the practice questions given by the teacher, and students feel bored when studying chemistry for too long because there are too many chemical bond subjects. abstract material. The abstractness contained in this material makes students tend to use memorization to overcome the difficulties they face (Simangunsong & Pane, 2021). This causes what the teacher conveys to students to be meaningless so that student learning outcomes are low.

Learning media is a tool that helps in creating material so that the learning process becomes more interactive and easy to understand student. Conveying the meaning of learning can be clarified by using learning media so that learning objectives can be conveyed more clearly perfect and good. Through learning media as a means of liaison between students and educators can improve quality learn and create a pleasant learning situation. Therefore, very learning media is needed to support the learning process and make it easier for students to understand the material being studied (Mashudi et al, 2023).One of the main advantages from the use of learning media interactive is a capability to present inside information various visual forms and multimedia. Visualization and content rich multimedia can help elementary school students understand difficult concepts and complex better (Utomo, 2023).The use of media is necessary to achieve learning objectives. The success of a lesson is not only determined by the application of the learning model but also determined by the use of learning media. Creative and innovative teachers can utilize and use media according to the material to be taught. The use of learning media can reduce the elements of verbalism that occur. By using media, abstract concepts can be understood concretely by students. The use of learning media will be realized with technological advances, making it easier to improve the quality of learning. Learning media such as games or games can motivate students. The use of digital snakes and ladders learning media has attracted attention with the finding that learning media can increase student activity, cooperation and discipline in the learning process (Novita & Sundari, 2020). By understanding the use of learning media, it will influence the motivation of teachers and students in the learning process. Choosing the right teaching materials in the learning process can increase students' interest in learning. Low student learning behavior is the main problem in the learning process in high school. Media with good learning tools will guide students in the learning process, and teaching materials that suit student characteristics are teaching materials packaged in interesting learning media (Andani, 2023). All aspects related to learning will be optimized by creative teachers and innovative so that learning activities are not watching and boring (Junaidi et al, 2021). Media use digital learning as a form of innovative learning in learning because provides benefits for both teachers and students. Digital learning media must also be balanced with elementary school teachers' abilities in the field of technology (Adventyana, 2023).

Widowati (2014) found research results that showed an increase in learning outcomes using technology-based snakes and ladders media with student learning outcomes showing classical completeness in cycle I of 68.75% and an increase in cycle II of 81.25%. Then Mahkumala Napitupulu & Hardianti, (2018), found research results that the use of macromedia flash-based snakes and ladders media had an effect on student learning outcomes. From the results of the gain test calculations, an experimental class gain index was obtained of 0.667 which was included in the medium category with an increase in learning outcomes of 98.8%. . In the control class, a gain index was obtained of 0.572, which is in the medium category with an increase in learning outcomes of 77.9%. Furthermore, Nuryanti (2017), Haryanto & Adiwiharja, (2015) found research

results that the snakes and ladders learning media which included education was wrong. a medium that can make it easier for students to understand the lessons given by the teacher so that learning can be effective and fun and interesting. Likewise, Kurnia et al., (2018) with research subjects of high school students and the research method used was quasi, found that there was an increase in learning outcomes using Android-based snakes and ladders media in terms of the percentage of student activity of 80.64%.

Based on problems that occur , then on research this , done learning with snake media digital ladder for increase motivation and results Study students at SMAN 5 on the material bond chemistry.

▪ METHOD

Population in study This is all over student class X SMA Negeri 5 Medan consisting of from 12 classes . Deep sample study This took 2 classes purposive sampling, with each of two class There are relatively 30 students homogeneous the status . Homogeneity This seen from results *pretest* . Study This including study experiment pseudo *(quasi experiment).* In research This use design study that is *pretest-posttest control group design* (Fraenkel, Wallen & Hyun, 2012).

Table 2.1 Research design

Group	***Pretest***	**Treatment**	***Posttest***
Experiment I	T_1	X	T_2
Experiment II	T_1	Y	T_2

Information :

X = Learning using a cooperative model type assisted TGT Media power point

Y = Learning use model cooperative TGT type with media digital snake ladder

T_1 = Pretest results class experiment I & II at the beginning study

T_2 = Posttest results class experiment I & II at the end study

Deep data study This obtained through instrument test choice multiple , and non-test instruments . In research This data obtained in the form of questionnaire motivation evaluation motivation Study students and results learning (*posttest)* . Testing normality using *the Shapiro- Wilk* test , homogeneity using *the Levene Statistics* test , hypothesis tested use *Independent Sample T-Test* and *Bivariate Pearson Correlation* , with level significance (α =0.05).

▪ RESULT AND DISCUSSION

Research result

1. Motivational Data Study

After activities learning finished , then a post-test was held for know motivation and results Study end student . Based on results research , after calculated the average level motivation Study students in class experiment I and class experiment II. Tabulation of average motivation Study student served in table 3.1.

Table 3.1. Description Motivational Data Statistics Study Student

Class	Amount Student	Average Percent

		Pre-Test	Post-Test	N- Gain
Experiment I	30	49	63	27
Experiment II	30	53	72	40

When *games* and *tournaments* take place student active ask , answer and discuss in group For For solve problem form questions given by the teacher right concept . Motivation as factor main in Study ie works gives rise to , underlies , and moves deed Study . According to results study through observation straight away , that most great student his motivation will enterprising trying , looks dashing , no Want to give up , as well enterprising read For increase results Study as well as solve the problem he faced (Rahman, 2022).

In accordance with calculation data shown in Table 3.1. class pre-test average score experiment I obtained 49% and post-test 63% with enhancement motivation Study by 27%. Whereas class pre-test average score experiment II obtained 53% and post-test 72% with enhancement motivation learning 40 %. So that stated that motivation Study student class experiment II studied with snake media digital ladder obtains the average value more tall than the students being taught with powerpoint media . By diagram graphs can be seen as in Figure 3.1 below .

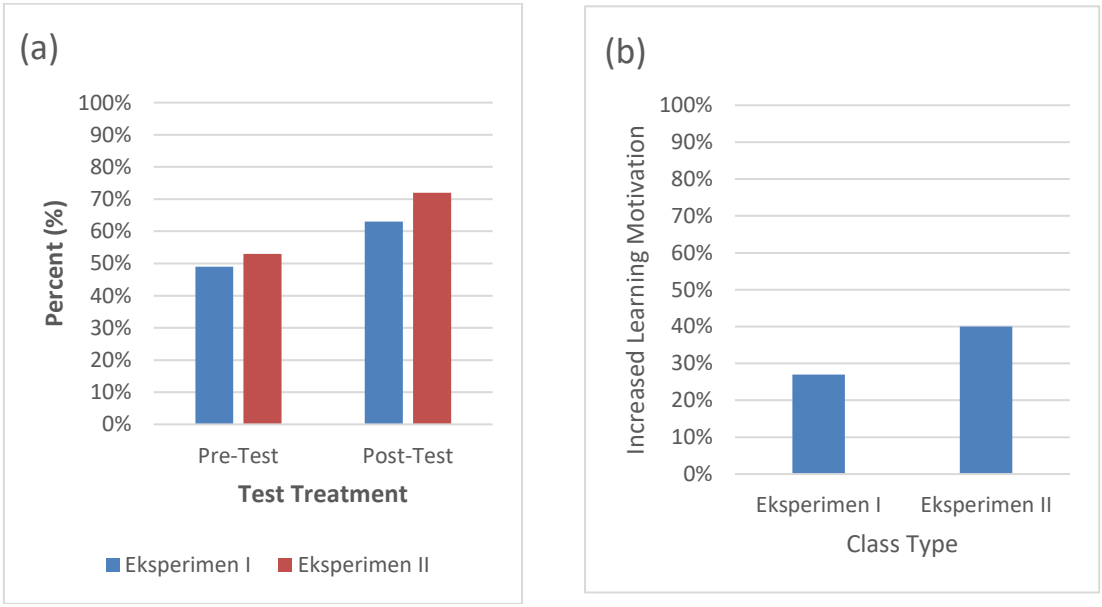

Figure 3.1 . Average Motivational Score Diagram Learning (a) and Improvement Motivation Study Student (b)

2. Learning Outcome Data

Based on results research , after calculated the average level results Study students in class experiment I and class experiment II. Tabulation of average results Study student served in table 3.2.

Table 3.2. Description Learning Outcome Data Statistics Student

Class	Amount Student	Average

		Pre-Test	Post-Test	N- Gain
Experiment I	30	30	78	69%
Experiment II	30	27	83	76%

These results show that the average result Study students studied with snake media more digital ladder tall compared to with average results Study students studied with power point . This matter caused by learning with apply snake media digital ladder in the classroom experiment I was able push student For involved active in the learning process through games and tournaments . There are groups Study with ability heterogeneous academics so that student with principles of peer tutoring and discussion capable learn material bond chemically overall so you can do question in games.

In accordance with calculation data shown in Table 3.2. class pre-test average score experiment I obtained score 30 and post-test 78 with enhancement results Study amounting to 69% in the category currently . Whereas class pre-test average score experiment II obtained 27 and post-test 83 with enhancement results learning 76% categorized tall . So that stated that results Study student class experiment II studied with snake media digital ladder obtains the average value more tall than the students being taught with powerpoint media . By diagram graphs can be seen as in Figure 3.2 below .

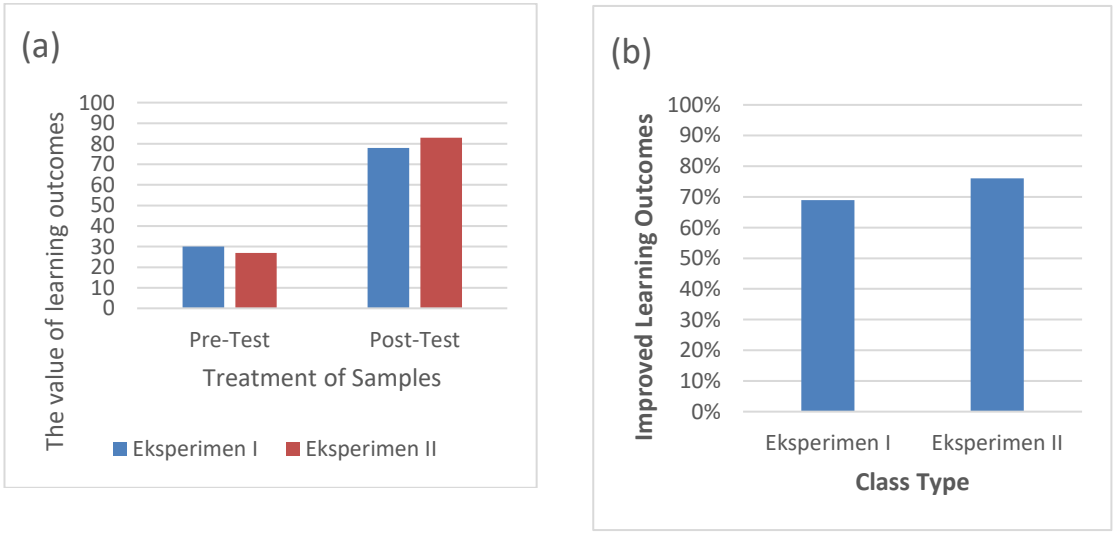

Figure 3.2 Diagram of Average Learning Outcome Values (a) and Improvement in Learning Outcomes Student (b)

Research Data Analysis

A. Motivational Data Analysis Study

1. Normality test

Normality test results can seen in table 3.3 below .

Class	Data	Sig	α	Information
Experiment I	Pre-test Post-test	0.109 0.398	0.05 0.05	Normally distributed Normally distributed

Experiment II	Pre-test Post-test	0.426 0.084	0.05 0.05	Normally distributed Normally distributed

Table 3.3 . Motivation Data Normality Test Results Study

Based on the data in Table 3.3 results data processing with *SPSS 24 for Windows*, for pre-test and post-test data in class experiment I and in class experiment II was obtained that the data is normally distributed with sig value . > 0.05.

2. Homogeneity Test

Homogeneity test results can seen in table 3.4 below .

Table 3.4. Motivation Data Homogeneity Test Results Study

Class	Data	Sig	α	Information
Experiment I	Pre-test Post-test	0.065 0.069	0.05 0.05	Normally distributed Normally distributed
Experiment II	Pre-test Post-test	0.069 0.065	0.05 0.05	Normally distributed Normally distributed

Based on the data in Table 3.4 results data processing with *SPSS 24 for Windows* , for pretest and posttest data in class experiment I and in class experiment II was obtained that the data is homogeneous with sig value . > 0.05.

3. Hypothesis Test I

Results data hypothesis test calculation I can seen in Table 3.5 below .

Table 3.5 . Hypothesis Test Results I

Data	Class	Average	Standard Deviation	Sig(2-tailed)	α	Information
Post-test	Experiment I Experiment II	75.93 86.83	6,384 3,696	0,000 0,000	0.05 0.05	Ha accepted

Based on the data in table 3.5 results data processing with *SPSS software for windows*, Hypothesis testing use *Independent Sample T-Test* is known that mark 2-tailed significance is 0.000, where sig value . < α (0.05). so can concluded in hypothesis I that Ha is accepted and stated there is difference motivation Study students studied with digital snake and tang media on the material bond chemistry .

B. Learning Outcome Data Analysis

1. Normality test

Normality test results can seen in table 3.6 below.

Table 3.6 . Normality Test Results of Learning Outcome Data

Class	Data	Sig	α	Information
Experiment I	Pre-test	0.115	0.05	Normally distributed
	Post-test	0.063	0.05	Normally distributed
Experiment II	Pre-test	0.128	0.05	Normally distributed
	Post-test	0.126	0.05	Normally distributed

Based on the data in Table 3.6 results data processing with *SPSS 24 for Windows*, for pre-test and post-test data in class experiment I and in class experiment II was obtained that the data is normally distributed with sig value . > 0.05.

2. Homogeneity Test

Homogeneity test results can seen in table 3.7 below .

Table 3.7 . Results of the Homogeneity Test of Learning Outcome Data

Class	Data	Sig	α	Information
Experiment I	Pre-test	0.350	0.05	Normally distributed
	Post-test	0.510	0.05	Normally distributed
Experiment II	Pre-test	0.509	0.05	Normally distributed
	Post-test	0.349	0.05	Normally distributed

Based on the data in Table 3.7 results data processing with *SPSS 24 for Windows*, for pre-test and post-test data in class experiment I and in class experiment II was obtained that the data is homogeneous with sig value . > 0.05.

3. Hypothesis Test II

Results data Hypothesis test calculation II can be done seen in Table 3.8 below.

Table 3.8 . Hypothesis Test Results II

Data	Class	Average	Standard Deviation	Sig(2-tailed)	α	Information
Post-test	Experiment I	78.67	7,184	0.022	0.05	Ha accepted
	Experiment II	82.83	6,524	0.022	0.05	

Based on the data in table 3.8 results data processing with *SPSS for Windows software* was obtained sig value . = 0.022 where sig value . < α (0.05), then can It is concluded in hypothesis II that Ha is accepted and stated there is difference results Study students studied with digital snake and tang media on the material bond chemistry.

C. Analysis Correlation (Hypothesis Test III)

Results data hypothesis test calculation III can be seen in Table 3.9 below.

Table 3.9 . Hypothesis Test Results III

Class	Pearson Correlation	Sig (2-tailed)	α	Information
Experiment I Experiment II	0.618 0.785	0,000 0,000	0.05 0.05	Ha accepted

Results of analysis tests *bivariate correlation* of hypothesis third . H_0 accepted If Sig value. > 0.05, while Ha is accepted If Sig value . < 0.05. Based on results research, class experiment I had Sig value . 0.000 where < 0.05 and value *Pearson correlation* is 0.618 for class experiment I, enter in category correlated currently . And class Experiment II has Sig value . 0.000 where < 0.05 and value *Pearson correlation* is 0.785 in category correlated tall . the data show that motivation and results Study students studied with *snake* media correlated *digital ladder* tall or each other relate strong and influential . Research result This in line with research carried out by Yudanti & Premono, (2021)the person stating that There is correlation positive between motivation Study with results Study chemistry student . Research conducted by Simatupang et al., (2021) Ada positive and significant relationship between motivation Study with performance Study chemistry in class XI Science at SMAN 2 Jambi City.

▪ CONCLUSION

There is difference motivation Study students studied with snake media digital ladder compared to those studied with PowerPoint media on the material bond chemistry at SMAN 5 Medan with the average percentage is 63% in class experiment I and 72% in class experiment II with Sig value . 0.000 < 0.05. There is difference results Study students studied with snake media digital ladder compared to those studied with PowerPoint media on the material bond chemistry at SMAN 5 Medan with an average of 78 in class experiments I and 83 in class experiment II with Sig value . 0.002 < 0.05. There is connection positive between motivation Study with results Study students studied with snake media digital stairs at SMAN 5 Medan with Sig value . 0.000 < 0.005 on a Pearson correlation of 0.785 (category tall).

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