Handouts: Learning Motivation Based on the Implementation of Virtual Media

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Abstract: This study aims to describe the increase in learning motivation of data processing on learning Mathematics in grade 4 students using virtual media. The research procedure applied in this research is classroom action research. The research is conducted in two cycles. The stages in this research are: planning, action and observation and reflection. From the results of learning activities that have been done for two cycles, obtained data research results as follows: a prominent motivation to learn is intrinsic motivation in the form of fun to implement learning data processing with virtual media of 79%; Needs and interests 75%; 70% curiosity. Extrinsic motivation in the form of awarded 78% and clarity 73% of learning objectives. The highest score of student's responses to learning data processing using virtual media is that students feel very enjoyable learning of 83.33%. From the observation, it is known that the students are more active. Increased motivation to learn impact on learning completeness increased from the first cycle of 56.67-76.67% in cycle II. Obstacles in the implementation of learning is the internet network connectivity and time allocation in conducting experiments using virtual media. Based on the results of data analysis, it can be concluded that the use of virtual media can improve student's learning motivation on data processing materials by 20%.

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INTRODUCTION

The main central of any applied science subjects is Mathematics. Mathematics as a science related to ideas or ideas, structures and relationships are arranged logically are abstract, deductive reasoning and can enter other branches of science.

Mathematical education like other fields of education in various countries, especially, in developed countries has been rapidly adapted to the needs and challenges of nuanced technological progress. Associated with the learning of mathematics, many new tendencies are born as the embodiment of innovation and learning model reform. This change occurs as an answer to the challenge of globalization. Mathematics learning is very important in everyday life. In general mathematics is important for people's lives, therefore, Math lessons are included in the school curriculum.

Mathematics learning is the process of providing learning experiences to learners through a series of

planned activities, so that, learners acquire the competencies learned[1]. Mathematics develops a set of student skills which are necessary in everyday life including: the ability to calculate, measure, decrease and use formulas[2].

Mathematics learning in elementary school is one of the studies that always interesting to put forward because of differences in characteristics between the nature of the child with the nature of mathematics. Primary school children are progressing in the level of thinking.

Mathematics is a subject that must be taken by all students in all levels of education. The higher the level of education, the more complex the material taught in the classroom. Core competencies of mathematics that must be mastered in grade 4 elementary school includes a negative integer (including using a number line), the operations of addition, subtraction, multiplication and division involving negative integers, numbers count, fractions and/or decimals in various forms in the order Operation, explaining the center point, the radius, the diameter, the arc, the bowstring, the tarpaulin and the circle of the juring, explaining the approximate circumference and area of the circle, comparing the prisms, tubes, pyramids, cones and balls, explaining the wake of space which is a composite of several Wake up space and its surface area and volume, explain and compare the mode, median and mean of a single data to determine which value best represents the data.

Between one learning materials with other learning materials are interrelated. This association causes the students to have an obligation to understand the mathematical material from the beginning. Class VI students tend to be less able to understand the basic concepts of mathematics taught in the previous ladder. Based on interviews with colleagues stated that although, it has been explained the basic concepts of mathematics, there are some students who still do not understand . This is even more complicated when students are less able to memorize or understand counting operations that serve as applications of other mathematical learning.

The difficulties experienced by students during the learning process of mathematics make students less motivated in learning Mathematics. Learning motivation is an internal and external impetus for students learning to conduct behavioral changes in general with several indicators including desire to succeed, encouragement and learning needs, expectations and aspirations, rewards, exciting activities, the existence of a conducive learning environment. So, the motivation to learn is an important element in the learning process to create a conducive learning atmosphere in order to achieve the learning objectives that have been formulated previously[3]. Motivation to learn should be created by the teacher as a facilitator in student learning, so that, students are expected to learn with enterprising and passionate with all what is aspired by students.

One of the most appropriate ways to improve student learning motivation is to maximize the use of instructional media. After studying various media in learning that have been developed and applied in the world of education, then possible media can be used for the achievement of improving student's learning motivation, especially, grade 4 of elementary school.

The formulation of the problem in this research is (1) How can the virtual media to improve student's motivation to learn math subjects? and (2) What is the student's response to the use of virtual media in the subject of Mathematics? The specific purpose of the research is to apply virtual media in classroom learning in order to increase the motivation of learning grade 4 elementary students. In general, the results of this study can contribute one of the alternative media can be used to improve student's learning motivation.

Conceptual framework

Learning motivation: Motivation can be in the form of basic or internal and intensive drives outside of individuals or gifts. Motivation is the process of generating, maintaining and controlling interests[4] motivation is seen as a mental drive that drives and directs human behavior including Dimyati's[5] learning behavior.

Motivation is the driving force that resulted in an organization member willing and willing to mobilize the ability in the form of expertise or skills of the inner power to organize various activities in answer in order to achieve the goals and organizational goals that have been predetermined.

Purwanto[6] mentions that motivation contains three main components namely: move, direct or channel behavior, sustain and maintain behavior.

Learning motivation is an internal and external impetus for students learning to conduct behavioral changes in general with several indicators including desire to succeed, encouragement and learning needs, expectations and aspirations, rewards. The existence of a conducive learning environment[3].

Motivation to learn is a psychological factor that is non-intellectual. Its typical role is the growth of passion, feel happy and the spirit to learn[7]. Many students do not develop in learning because of the lack of motivation that can encourage students to learn.

Some forms and modes of motivation in learning activities include: scoring; prizes; competition or competition; ego-involvement; replicate; knowing the results; praise; punishment; the desire to learn; interest; (K) objectives recognized[7].

Fig. 1: Basic human needs

Motivation: Maslow shares the following human needs[8]:

- Physiological needs are the most basic human needs hierarchy that is the need to live like eating, drinking, housing, oxygen, sleep and so on
- Needs sense of security
- Social needs, namely the need for friendship, affiliation and closer interaction with others
- The need for appreciation, this need includes a desire to be respected, rewarded for one's achievement, recognition of one's abilities and skills and the effectiveness of one's learning

Needs of self-actualization. Self actualization is related to the process of developing the true potential of a person. This need seems to be dominant in high school age children in elementary school. At that age, children begin to realize their potentials, so that, the child seeks to meet those needs with competitive attitudes.

Competition that they do is a manifestation of the desire to become the greatest. With self-actualization, they are trying to achieve achievement. Motivation developed to students aims to develop them/compete positively to meet the needs of self-actualization (Fig. 1).

Virtual media: Learning media is everything that makes students able to acquire knowledge, skills and attitudes. This means the teaching medium helps students achieve the competencies of the cognitive, affective and psychomotor domains.

There are varieties of innovative learning media that teachers can use to attract student's attention in the classroom including: animations, modules, concept maps, comics, real laboratories, virtual labs and so on. The teacher as a facilitator should be able to determine what learning mediums are appropriate. Learning media used in this research is a virtual media. By using this media then the computer facilities can be utilized properly and can give a positive influence on student learning motivation.

Hasanah states props based on computer technology, called "Maya Viewer". Computers as one of the world's spectacular innovation results spark the creativity of mathematics educators, starting from the ideas of real props are commonly used as a tool in learning mathematics transformed in the form of digital objects in the form of computer programs that can be used as real props by Students using the maximum visual representation. Virtual manipulatives (visual manipulatives) is a visual representation of web-based dynamic objects.

Along with the development of technology in the world, virtual props (Virtual manipulatives) have a big effect on the development of education. In the present study, the use of computer and internet technology in schools or classes brings changes also to the approach of learning mathematics. By utilizing the results of these innovations, learning can be made Become more attractive, effective and efficient if well designed. Learning using media that utilizes virtual technology, brings changes in the world of visual aids as one of the mathematics learning media that helps students in bridging real world and math abstraction.

MATERIALS AND METHODS

Research design: Data collection techniques used in this study include documents, questionnaires and observations.

Document: Documentation is done to obtain data in the form of post test in each cycle. The data is used as a support for the improvement of student learning motivation taught using virtual media.

Questionnaire motivation learning data processing and student response: Questionnaires are given to students at the end of each cycle. Questionnaire is compiled using Likert scale. Likert scale used has an alternative answer positive value 5 to 1. Pemberian score is done on answers to questions, both on the virtual media (variable X) as well as increased motivation to learn (variable Y).

Total motivation instrument is 26 points statement, the highest score is $26 \times 5 = 130$. While the lowest score $26 \times 1 = 26$. To determine the criteria of assessment of learning motivation consisting of very good, good, enough, less and very less.

Observation: In this class action research, observation aims to monitor the suitability of the use of virtual learning media in the learning process of mathematics.

Data analysis techniques: Learning motivation and student responses to the use of virtual media

in Mathematics learning were analyzed using descriptive statistics and inferential statistics.

Descriptive statistics: This study uses data analysis techniques through the steps as follows:

- Observe the activities of teachers and students during the learning activities
- Collect student motivation questionnaires and learning responses
- Create tabular data
- Enter data into tables
- From the scores obtained, grouping based on the category of student's motivation level

Inferential statistics: The inferential statistics used in this study were the one-way ANOVA used to test the average comparisons of multiple data groups (cycles 1 and 2). To analyze the data, researchers use computer assistance SPSS 11.5 for windows program. Prior to the one way ANOVA test, a homogeneity test was performed. If the test results showed the average difference of intergroup parameters, then a follow-up test (post hoc test) using t-test to know which of the two different groups significantly. The t-test used is t-test Dunnet.

RESULTS AND DISCUSSION

Cycle 1

Student's motivation to study: The recap of the score given by students to the statements in student motivation Questionnaire is made with the following conditions:

For statements with positive criteria: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. For statements with negative criteria: 1 = strongly agree, 2 = agree, 3 = neutral, 4 = disagree and 5 = strongly disagree.

Based on Table 1 it is known that the dominant intrinsic motivation in cycle 1 is the need with an average of 69.6%. While the highest percentage of extrinsic motivation affecting student learning is the clarity of learning objectives reach 72.6%. Motivation that got the lowest average score was interest (66%) The percentage of student's motivation to study in cycle 1 as a whole reached 69%.

In general, the student's learning motivation in the learning process of data processing in the first cycle is still low because it has not reached 75%. This becomes the researcher's note for improvement in the next cycle.

Student response: The process of learning data processing with virtual media in cycle 1, students who

Table 1: Recapitulation of students learning motivation questionnaires in cycle 1

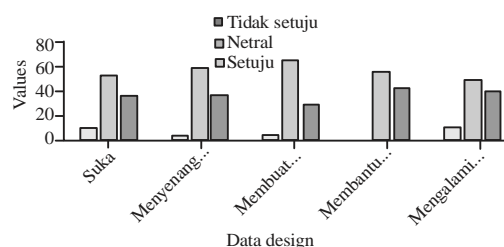| Motivation factors	Motivation aspects	Mean score	Percentage
	Need	3.48	69.6
	Interest	3.30	66.0
Intrinsic	Curiosity	3.34	66.8
	Pleasure	3.40	68.0
Extrinsic	Learning goal explanation	3.63	72.6
	Reward	3.60	72.0

Fig. 2: Students learning motivation in cycle 1

like the lesson of data processing and happy to be taught with virtual media equal to 36.67%. As many as 30% of students feel eager to use virtual media when learning data processing. As many as 13 students or 43.33% agree that the use of media helps in learning data processing. While those who feel difficulty when learning data processing with virtual media there are 12 students or by 40%. For more details can be observed in Fig. 2.

The average value of student's learning motivation is 78.77 and learning completeness reaches 76.67% or there are 23 students from 30 students have complete study. These results indicate that in this second cycle, the learning completeness in class has improved better than cycle 1. There is an increase in student's learning motivation because teachers use virtual media during the learning process and students have the opportunity to play games with virtual media. Although, initially students have difficulty in doing the game with the virtual media, thanks to the guidance and direction of the teacher, students are motivated in learning which ultimately increases student's understanding in study data processing. It can be observed from the test results of students who have increased.

Cycle 2

Student's motivation to study: Student learning motivation in cycle 2 has increased compared to cycle 1 with average 75%. While the highest mean percentage of motivation that affects student learning is pleasure 79%. Motivation that gets the lowest average percentage is curiosity (70%). In cycle 2, the outline of student learning motivation in data processing learning activities have increased.

Student response: The most dominant student response in cycle 2 is the feeling of happiness toward learning data
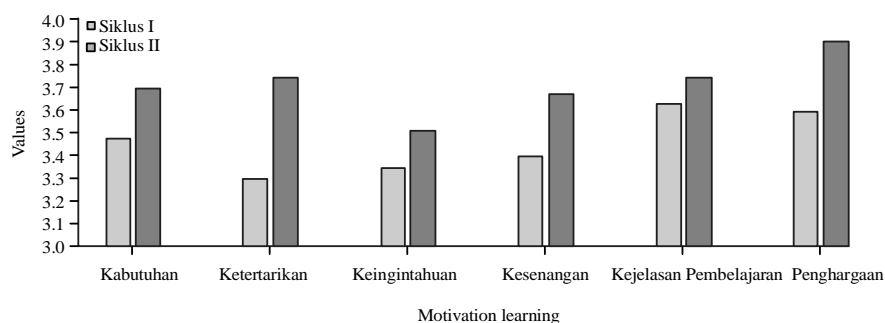
Fig. 2: Comparison of the mean of learning motivation score in cycle 1 and 2

processing using virtual media that is 83.33%. When compared to cycle 1, this activity has increased. The response of students who have increased but still not maximal is more eager to learn by using virtual media 66.67%, likes lesson processing data 73.3% and usage of media useful to help executed 70% learning (Fig. 3).

As the data support the increase in learning motivation data processing taught with virtual media, the researchers describe the results of student tests on cycle II with the criteria mastery of at least 75%.

Data analysis of contextual based handout development that has been implemented through two stages, namely validation and small group test. Validation is done by media experts and material experts. It aims to measure whether the product development that has been made is feasible for use on field tests. The data obtained from the validator in the form of quantitative data obtained from the questionnaire given to each validator with comments and suggestions for improvement of interactive multimedia. Assessment on the questionnaire is as follows:

- 1 = not good
- 2 = less good
- 3 = good
- 4 = very good

Questionnaires were given to subject matter experts and media, each having a number of 18 statements, each statement has the highest score worth. Sehingga maximum score is $18 \times 4 = 72$. Dari questionnaire completed by Drs. Suprayitno, M. Si as a material expert got the feasibility of handouts of 85%. While the questionnaire that has been filled by Mr. Dr. Fajar Arianto, M.Pd as a media expert, the feasibility of handouts is 85% as well.

From the results of small group trials that in 6 students grade 4, obtained the result that the average score is 3.52 with very good category. Percentage of contextual based handout feasibility 88.02%. So, it can be concluded that the context-based handout is quite feasible to use. So, from the results of these trials can be stated that the contextual-based handout can be used to test a large group or field to be applied and known practicality and effectiveness in learning.

Contextual-based handouts that have been declared valid and fit for use by the validator and also from the small group trial then contextually based handout can be used in learning to determine the practicality and its effectiveness in learning. Contextual based handouts will be used in accordance with the learning implementation plan that has been made.

Handouts practicality: The practicality of learning using teaching materials can be seen through the observation of the implementation of learning and observation of student activities during learning. In the experimental class learning results obtained an average score of 3.74 with very good category. While on the experimental class learning activity results obtained an average score of 3.68 with very good category.

Handouts effectiveness: The effectiveness of learning using teaching materials can be seen through student learning outcomes in experimental class 4a (class using contextual based handouts) and with class 4b control (class without using contextual based handouts). The learning results of the students of the cognitive domain before learning are derived from the pretest and results Student learning after learning is obtained from the posttest score.

In the experimental class as many as 20 students who followed the pretest with minimum exhaustiveness Criterion (KKM) 75 resulted 7 students complete and 13 students unfinished with an average of 61.5%. Then after a conceptual-based handout was implemented, there was a significant change in the result of a significant student/ posttest test. In the experimental class as many as 20 students who followed the posttest with Minimum Exhaustiveness Criterion (KKM) 75 resulted 16 students complete and 4 students unfinished.

Based on calculations using significant test for posttest value in this study obtained t_{table} of 2.024 and t_{count} of 4.743. Thus, it can be concluded that t_{count} is bigger than

t_{table} then H_o is rejected, so, H_a is accepted, so it can be concluded that there is significant difference of learning result by using contextual based handout on social learning, theme beautyof my country, subtheme natural beauty of my country.

Learning motivation: Learning motivation is an internal and external impetus for students learning to conduct behavioral changes in general with several indicators including desire to succeed, encouragement and learning needs, expectations and aspirations, rewards. The existence of a conducive learning environment[3]. The result of the analysis showed that the student's learning motivation resulted in significance value <0.05. Thus, it is concluded that there are significant differences in student learning motivation based on the second cycle of learning phase. Viewed from the average score, the student's learning motivation in cycle 1 is different from the student's learning motivation in cycle 2.

Average percentage of score, student's learning motivation in cycle 1 (69%) lower than student's learning motivation in cycle 2 (75%), so can be said that student learning motivation after implementation of data processing learning using virtual media start cycle 1 until cycle 2 there is an increase in learning motivation. The occurrence of increased motivation to learn can encourage students more eager in learning to understand data processing materials. As expressed by Saifudin where motivation is able to encourage someone to want to do optimally in implementing something that has been planned to achieve the goals that have been set.

Student motivation with the implementation of learning using virtual media is better than before. This can be seen from the results of questionnaires of students with aspects of needs, interest, curiosity, pleasure, clarity of purpose, learning and appreciation that the majority respond to agree on the statement of these aspects. Processing data using virtual media can increase student learning motivation. Thus, Mathematics lessons in accordance with the application of the use of virtual media.

Once the importance of the use of virtual media in math lessons to improve student's motivation to support the opinion of some experts that the existence of learning media, especially, virtual media can provide great benefits for the smooth learning process, the learning process can be done with a short time, increase motivation and interest Learn the students, make it easier for students to understand the material presented by the teacher, broaden the student's insight and experience.

In essence, with the virtual media can provide motivation to students to learn and facilitate the delivery of information. Virtual media is a force that will increase student's motivation to do something to achieve the desired goals.

Reflection on student response: In the first cycle of learning data processing using virtual media still received less response from students. This is because their adaptation still tends to the introductory stage. The student's initial ability is still low, so, this stage takes a lot of time to convey learning data processing. Teachers encourage more students to ask questions for students to understand the material presented. The effort was fruitful, as evidenced by the increase in student responses in the second cycle that most say "yes". Student response in the second cycle shows a good response. Students respond data processing delivered with virtual media almost all aspects very well, although, some students still have difficulty using virtual media. This is because the use of virtual media is new for the students.

CONCLUSION

Student learning motivation after the implementation of data processing learning using virtual media from cycle I until cycle II happened to increase motivation learn. This is proved by difference in result of questionnaire motivation learn student based on second cycle. Based on each of the criteria of motivation, cycle 2 has increased the average score of students' learning motivation on the data processing materials from the lowest questionnaire of the first cycle by 66-70% in cycle 2 and the highest motivation questionnaire results 1 cycle of 72.6-79% in cycle 2. The increase of student's learning motivation has an impact on learning completeness which is increased to 76.67% compared to the percentage of completeness in the first cycle of 56.67%. Thus, the learning motivation of learning math increases after being taught using virtual media.

Student responses to the use of virtual media in the learning of mathematics in cycle 2 is better than cycle 1. In cycle 1, student's responses below 45%. That is almost all aspects received less positive response from students. In cycle 2, student feel using virtual media in learning data processing is very fun (83.33%) and student likes lesson of data processing taught using virtual media (73.3%). While the spirit of learning by using virtual media reached the lowest percentage of 66.7%. It is the teacher's job to find ways to make students more eager to learn. It is expected that the results of this study can be developed in subsequent research with different objects and increase the number of research subjects or use other media in order to obtain better results

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