



Application of Crossword Puzzles to Increase Student's Learning Outcome on Motion System Material of Biology

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Abstract

This research is a classroom action research that aims to increase student's learning outcome on motion system materials through the application of Crossword Puzzles. Design research conducted by 2 cycles which starts from planning, action, evaluation, to the reflection, then proceed to the second cycle. Research subject is Grade XI MIA 4 in SMA Negeri 1 Pangkajene, odd semester in 2014/2015 years as 33 students consisting of 10 men and 23 women. Data collection technique conducted in the classroom action research with the learning outcomes test each cycle. Data analysis technique used in this study are analysis quantitative and gain normalized. Based on the analysis it can be concluded that student's learning outcome an increased from first cycle to second cycle, with average percentage of 39.90 with less category became 79.70 on a good category.

Keywords: classroom action research, learning outcome, crossword puzzles

1. Introduction

Education is a process in order to affect students so that is able to adapt as best as possible with their surroundings, and will cause the change in themselves that allows it to participate in public life. The development of science and technology is rapid, as well as globalization that hit the world including Indonesian Nations resulted in any change in various aspects of public life.

The success of the learning process is one alternative the coveted in implementing education in the school. The teacher is one of the components that determine the success of education because they are transferring knowledge to the students. During the process of learning, teachers should use the media of learning that make students more interactive so that the desired learning goal achieved optimally. Media of learning used should be based on the students (student center) so that in its implementation the students more active and understand from what the teacher delivered as mediator and facilitator in learning.

Based on the observations of the researchers in SMA Negeri 1 Pangkajene, Distroct of Pangkep, found some problems in the process of learning include: (1) The attention of students towards less lessons so that students are less noticed and tend to make activities other than learning, (2) The learner are not working on the task, not to follow the learning well and even left classrooms an ongoing learning, (3) Learning in the classroom is still dominated by the teacher, causing saturation to students, consequently students tend to be passive and simply record what is presented by the teacher (4) Teacher how to study a monotonous with just completing tasks and discussion groups. motivation and learning results.

Utilization media of learning in SMA Negeri 1 Pangkajene,

Pangkep Regency is still very less used. This leads to a lack of motivation of students to learn because students difficult to understand subject matter much less material which is abstract and imaginary power is high, as a result of learning students on biological subjects today is still not satisfactory, so the researcher wanted to give an idea to the teachers who are in school that the use media of learning can be a positive influence on learning of result students.

Utilization media of learning is one of the efforts to improve the quality of learning, learning of motivation and learning of result students. This is in line according to the Sobry (2007), that the use of the media is indispensable in the process of teaching and learning in schools because can help teachers in explaining a difficult materials particularly material that is abstract. Students will be more motivated to study biology and did not consider biology as a tough lesson but rather consider the lesson of biology is fun. In accordance with the purpose of learning and the characteristics of the motion system material in the form of difficult terms in mind, so that the process of study feels boring, then needed a proper media of learning in the process of learning so that students can be easily remember and process of study ever feels fun, like Crossword Puzzles.

Crossword Puzzles are a language game by filling the boxes with the letters that form words that can be read, either vertically or horizontally. Devising the test review in the form of a crossword puzzle will invite interest, motivation and participation of students. Crossword Puzzles as vocabulary learning techniques certainly more interesting because it contains elements of games, entertainment and can be done in a relaxed with various variations (Fathonah, 2013).

Using Crossword Puzzles can make students more interested

because students were invited to learn directly for reading, thinking, playing and determine by themselves the problems (answer). Therefore, it is expected to be applied and can increase motivation and results of learn students on the subjects of biology particularly in motion system material.

Based on background problems, then researcher interested and motivated to give a solution in improvement the quality process of learning which can be seen from the motivation and result of learning students which includes two aspects assessment are cognitive and affective. Researcher intends to do research about the application of Crossword Puzzles towards motivation and result of learning students with the title research on "Application of Crossword Puzzles to Increase Student's Learning Outcome on Motion System Material Grade XI MIA 4 at SMA Negeri 1 Pangkajene, District of Pangkep".

2. Materials and methods

Research Desing

Design Research in Figure 1 consists of two cycles, each cycle is performed at the end of student assessment and questionnaire learning motivation. Each cycle consists of 3 sessions (6 x 45 minute hour lesson) that is carried out in accordance with the changes to be achieved. Activities on the next cycle is an improvement from the previous cycle if it has not reached the expected indicators, then proceed to the next cycle.

Research Subject

This research was carried out on the odd semester academic years 2014/2015 on the material motion system consisting of 33 students namely 10 men and 11 women on grade XI MIA 4 SMA Negeri 1 Pangkajene, Andi Mauraga Street no. 1, Indonesia.

Research Procedures

a. First Cycle

1) Action Planning

After the data is analyzed, then observations done planning as follows: Drawing up the syllabus, lesson plan for 6 meetings, Worksheet (LKPD) at each of the meetings as 6 LKPD which contains the steps work Crossword Puzzles to support learning activities, and test results outcome.

2) Implementation of the Action

The implementation of the action carried on first cycle.

3) Evaluation

During the awarding of the action, the Observer documented the impact of the act provided for the learning process and provide the basic biology in doing reflection during the first cycle. The awarding of the evaluation in the form of multiple choice question as many as 30 items for 90 minutes. In administering the test, students must work the problem individually and when there is a less obvious question is asked to the teacher or supervisor exam.

4) Reflection

Stage of reflection is implemented at the end of the cycle by looking at the achievement of students learning outcome. The

results of the reflection the cycle I this is what made the

author's reference to plan cycle II, so that the results achieved at the next cycle in accordance with the plans that have been prepared and should be better than the previous cycle.

b. Second Cycle

1) Action Planning

Based on the reflection first cycle, in second cycle designed improvements against actions that will do next with the intent of covering a shortage that occurred in first cycle.

2) Implementation of the Action

The implementation of the action carried on first cycle.

3) Evaluation

The awarding of the evaluation in the form of multiple choice question as many as 30 items made during the 90 minutes. In administering the test, students must work the problem individually and when there is a less obvious question is asked to the teacher or supervisor exam.

4) Reflection

Researchers gather all data obtained from the second cycle has been done, then made a conclusion on the results of the study learners. Addressing the results of the reflection second cycle and after observing a variety of shortcomings and progress of learners during the second cycle seen that a large part of the obstacles that are found on the first cycle can be resolved and showed a more positive towards change. This research can be said to have been successful and no longer proceed to the next cycle because the indicators of success have been achieved. Nonetheless, researchers still consulted with teachers of subjects so that the deficiencies that occur in class remains fixed for better learning in the future. As for the results of the second cycle indicates that the results of student learning are already experiencing an increase compared to the results of the learning first cycle. Average value for second cycle is 79.70.

Data Collection Technique

As for the data collection technique that carried out in the classroom action research is collecting the test result student every cycle.

Data Analysis Technique

a. Test learning outcome

Management of data are analyzed quantitatively and qualitatively. For an analysis of descriptive analysis is used quantitatively are average score obtained from test results of each cycle aims to find out the level of mastery material through the portrayal of the characteristic distribution of the value of the achievement of the learning results of biology learners through the application of Crossword Puzzles. Average score includes the value of the average (mean), the highest value (maximum), and the lowest (minimum) value is processed with the help of the Microsoft Office Excel application, Then those values are grouped by viewing the designation guidelines based on the technique of categorization established by Depdiknas (2002) as follows:

Table 1: This Level of Mastery of the Results of the Study of Biology

Interval Value	Category
86 – 100	Very Good
71 – 85	Good
56 – 70	Enough
40-55	Less
0 – 39	Failed

Learning outcomes learner data obtained from the tests that will be carried out after the end of one cycle, then analyzed to see completeness learn biology learners individually using the formula (Arikunto, 2009), as follows:

Score =

$$\text{Nilai} = \frac{\text{Jumlah jawaban yang benar}}{\text{jumlah soal}} \times 100$$

Completeness learning to learners is determined by looking at the table completeness minimum criteria categories by SMA Negeri 1 Pangkajene. Completeness minimum criteria categories can be seen in table.

Table 2: Categorization of Completeness Minimum Criteria SMA Negeri 1 Pangkajene

Interval Value	Categories Completeness Learning
0-71	Not Completely
72-100	Completely

Qualitative analysis is done by looking at the results of observation during the teaching and learning of each cycle.

b. Gain Normality

Gain is the difference between the value of the cycle I and cycle II, the gain value shows increasing understanding or mastery of the concepts students after learning do teachers. Normal formula gain according to Meltzer (2002).

$$Nilai\ Gain = \frac{SsiklusII - SsiklusI}{Steringill - Sterendahl}$$

Meanwhile, the interpretation of the value of the gain that is:

Table 3: Categorization of N-Gain

No.	The value of N-Gain	Criteria
1	0.70 < g ≤ 1.00	High
2	0.30 < g ≤ 0.70	Medium
3	0.00 ≤ g ≤ 0.30	Low

3. Results & Discussion

Research Results

a. Student’s learning outcome

Student’s learning outcome data Grade XI MIA 4 SMA Negeri 1 Pangkajene cycle I and cycle II obtained from test the learning outcome every other cycle. Student’s learning outcome analyzed in quantitatively using the Microsoft Office Excel application. As for the result can be seen in table

Table 4: The Value of Descriptive Statistics of the Student’s Learning Outcome through the Application of Crossword Puzzles Grade XI MIA 4 SMA Negeri 1 Pangkajene on First Cycle and Second Cycle

fDescriptive Statistics	First Cycle	Second Cycle
Total	33	33
Minimum	20.00	60.00
Maximum	80.00	93.33
Average	39.90	79.70
Ideal Value	100	100
Standard Deviation	21.66	9.98
Modus	26.67	80
Median	30.00	80.00

Based on the statistics in table 4 shows, the increase in the minimum value obtained by students from first cycle to second cycle is 40.00. The maximum value obtained by students from first cycle to second cycle is 13.33. The increase in the average value of the student’s learning outcomes from first cycle to second cycle is 39.80 and have reached the

criteria minimum completeness is 72.

The value of the results of the study can be categorized into five categories based on the guidelines categorization according to Depdiknas (2002). Category frequency and the percentage of student’s learning outcome value can be seen in table 5.

Table 5: Category Frequency and Student’s Learning Outcome and Presentage through the Application of Crossword Puzzles Grade XI MIA 4 SMA Negeri 1 Pangkajene on First Cycle to Second Cycle

Interval Value	Category	First Cycle		Second Cycle	
		F	Percentage	F	Percentage
86 – 100	Very Good	0	0 %	14	42.42%
71 – 85	Good	8	24.24%	10	30.30%
56 – 70	Enough	0	0%	9	27.27%
40 – 55	Less	1	3.03%	0	0%
≤ 39	Failed	24	72.73%	0	0%
Total		33	100%	33	100%

Table 5 shows the increase in the student’s learning outcome from the first cycle to second cycle. The percentages of the student’s learning outcome category very good from first cycle to second cycle is 42.42%, 6.06% students included as good category, 27.27% students included the enough category. While the percentage of student’s learning outcome the less category decreased of first cycle to second cycle is 3.03% and 72.73% students included failed category.

Data about the completeness study can be seen based on absorbance students against material motion system, then put this completeness minimum criteria by SMA Negeri 1 Pangkajene. Frekuensi category and completeness presentation learning outcome can be seen in Table 6.

Percentage through the Application of Crossword Puzzles on a First Cycle to Second Cycle

Category	Score	First Cycle		Second Cycle	
		Σ	%	Σ	%
Not Completely	0-71	25	75.75	9	27.27
Completely	72 – 100	8	24.24	24	72.72
Total		33	100	33	100

Table 6 shows the student’s completeness learning. The percentage in the not completely category decreased of the cycle I to cycle II is 48.48%. The percentage in the completely category from first cycle to second cycle experienced an increase is 48.48%.

Table 6: Frequency Category and Completeness Minimum Category

b. Gain Normality

Analysis of gain normalized is used to find out how big the changes improved the ability of learning in the group taught by applying the Crossword Puzzles. The data value of the Gain students then grouped by category from the Gain value. Table 6 shows the average gain of normalized learning outcomes by applying the Crossword Puzzles

Table 7: Average Gain Normalized Learning Outcome

Subject	The Average N-Gain	Category
The students of Grade XI MIA 4	0.72	High

Based on the data analysis results in table 7 can be aware that the value of the average Gain in the students by applied Crossword Puzzles on Grade XI MIA 4 is 0.72, then it can be noted that the increase in students of Grade XI MIA 4 are on a high level. Data obtained from students Crossword Puzzles demonstrate effectiveness is high which means present Crossword Puzzles have effectiveness when applied in a study.

c. Reflection

1) Reflection cycle I

Based on the implementation of the actions using Crossword Puzzles for 3 times, found several problems in learning. As for the problems found are as follows:

- a) Learners do not focus on the learning material, most of the students there who play HP, talking with friends, there's also with friend which make other activities outside of learning, such as records/task in other subjects.
- b) Learning in the room is still dominated by the teacher giving rise to tired for the learners, learners tend to be passive on the learning progress.
- c) The teacher instructs the students noted the important term/keyword described but most of the students did not record important terms/keywords.
- d) At the moment working on LKPD in the form of Crossword Puzzles individually at the end of the learning for 15 minutes, some learners just cheating his friend's job even does not work on.
- e) Absorption material received the learners still very less due to inefficient processing time.

2) Repair Action Cycles II

As for the improvement of actions conducted in cycle II, among others:

- 1) The teacher gives more opportunity to learners for always ask so that learners have the opportunity to participate actively in learning.
- 2) Teachers explain the material with the object of demonstrating the learning material on the torso. After that, check out the teacher's understanding of learners by designating one of the learners to explain the back material that was already explained earlier.
- 3) When working on the task LKPD in the form of Crossword Puzzles, more active learners learn and feel sexually aroused to enhance better learning, contribute to learning, and can foster a sense of responsibility within the learners towards the learning process.

The results of each meeting to be returned to the students so they know to which the results of the achievement of the material received. Based on that reference more motivated learners to learn more enterprising.

4. Discussion

a. Learning Outcome

The Data in table 4 obtained through descriptive analysis with the help of the Microsoft Office Excel application. The value of the learning results of students in Grade XI MIA 4 SMA Negeri 1 Pangkajene show increase from first cycle to second cycle. The average value of the results of the learning learners first cycle is 39.90 of the ideal value of 100.00. While the average value of the results of the learning learners second cycle is 79.70 ideal value of 100.00. The increase in the average value of the results of the learning learners of 39.90. The lowest value of the first cycle was 20 and the highest value is 80.00. While the lowest value second cycle II is 60.00 and the highest grade is 93.33.

Data table 5 shows the percentage of the results of the study students cycle I it is still Gradeified as low. Low learning outcomes triggered by a low level of mastery learners against a motion system material. Students who enter the category either only amounted to 24.24 %, meanwhile, 3.03% of learners who enter categories less and 72.72% students entering category is very less. While the results of the learning learners on second cycle experience increased is 42.42%. the students entered the category of good, 30.30% the students entered the category of good, 27.27% students entering category enough, and less on the category and the category is very less has not been found. Improved learning results occur because the Crossword Puzzles involve participation learners active since learning activities begin. Students are invited to participate in all of the learning process, not only mentally but also physically involved. Learners will experience a more enjoyable atmosphere so that the results of the study can be maximized.

The results of the designation based on criteria of minimum completeness can be seen in table 6. In cycle I, 75.75% learners belongs in the category of not thoroughly and 24.24% learners belongs in the category of completely. Learners who belongs to a category is not completely due to several things, among others: (1) at the time the teacher explains the subject matter, some learners look are doing other activities such as writing, drawing, HP, playing and talking with friends, (2) at the time the teacher explains and then ordered to take down what you described but some learners did not record important terms material/study, (3) when working on worksheet, most learners indifferent towards his job, there are only cheating his friend's work there is also a learner not working on. Some of the above is expected to become a trigger for the low yield evaluation of learners.

Completeness learning students second cycle has increased with the percentage of 72.72%. In the meantime, students who belong to the category of not discharging of 24.24%. An increase in the completeness learn learners from cycle I to cycle II of 48.48%. Learners who belongs to a category is not complete due to a few of them do less interaction with the teacher or with a friend. They tend to still timid in asking or

suggested. Students complete both general conduct or interaction in the learning process. In line with the opinion of the Sari (2011) increased learning outcomes learner because crossword puzzles categorized as a stimulant which serves to manage stress and connects the nerves of the brain which is halved. Refreshing the memory effect, so that the function of the brain works back optimally because the brain is conditioned to keep learning with ease. The condition of a clear mind, relax and calm will make the brain memory is strong because the brain is conditioned to continuously learn with ease. Learning with tts that can make learners become more familiar and easy to fit in memory so that the learners are not easy to forget with the material already taught so that any memory increases.

Crossword Puzzles game done to launch a communication between students. The purpose of this game according to Nisak (2011:158) in Wijayanti (2013) are: (1) train the concentration of students, (2) reminded the subject matter that has been taught, (3) foster a sense of community of fellow students, (4) make a cozy atmosphere in the Grade room, and (5) drove out a sense of boredom in the class.

The results of this research aligned with Rogram's research (2015) says that use of the learning media Crossword puzzles on the IPA learning subject matter changes the appearance on Earth and Celestial Grade IV B SDN Jember can improve the learning results of learners. The results of the learning learners in Gradeical on cycle I of 51.67 and cycle II increased to 84.33. The results of the learning learners from learning cycles I to second cycle increased by 32.66. Febriyanto (2014) shows the results of the learning learners experience increased mainly on plantae material and the use of crossword puzzles be fun so improve understanding learners towards mastery of the material and the results of the study are maximum.

Febriani (2013) says that with applying TGT model of learning assisted Media Crosswords can increase the motivation of learners and learning results can be said that an increase in the motivation of learners PKN 22.9% and included in the category quite nicely. Fathonah (2013) the use of TTS media more effective for improving learning achievements of students than the media card to the study of chemistry via CTL on subject matter approach to addictive substances and psychotropic substances Grade VIII SMP 2 Ngadirojo, Wonogiri.

Kinanti (2014) stated that the motivation of learning learners Grade VIID SMP Negeri 2 Jember academic year 2012/2013 on the subject of ecosystem using the TGT model with TTS experience increased from pre to post cycle I cycle II. The results of the learning learners Grade VII D on the subject of ecosystems has increased from cycle I to cycle II. On the affective domain increased by 23.7%, and cognitive domains increased by 15.8%. More Sustainable (2011) said that the approach to Active Learning through methods Predict, Observe, Explain (POE) accompanied the crossword puzzles can increase the participation of learners in Junior High School science Grade learning VIIC Country 7 Purworejo.

5. Conclusions

Based on the results of the research that has been done in grade XI MIA 4 SMA Negeri 1 Pangkajene then it can be concluded that the learning outcome of learners on motion

system material has increased through the application of Crossword Puzzles in grade XI MIA 4 SMA Negeri 1 Pangkajene from first cycle to second cycle, with average percentage of 39.90 with less category became 79.70 on a good category.

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