Accelerated learning model with Prezi-assisted concept mapping to teach "Movement System"

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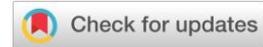
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ARTICLE INFO	ABSTRACT
	An accelerated learning model contained practical methods that can be used to accelerate students' mastery and understanding of learning materials. This study aimed to investigate the effect of the Accelerated Learning model with Prezi-assisted concept mapping on the eighth-grade students' ability to understand Movement System. This study employed a quasi-experimental pretest-posttest control group design and a cluster random sampling technique to select the sample. It involved students from class VIII.2 (control class) and class VIII.3 (experimental class) of SMP Negeri 3 Sekayu. The result of the t-test analysis showed that the Accelerated Learning model with Prezi-assisted concept mapping had an effect on the students' cognitive achievement (significance level of 0.000 < $\alpha/2$ (0.025)). The students' achievement in affective (honesty and discipline) and psychomotor (creativity in creating a mind map) domains was observed and analyzed during the learning process, then presented in percentage form. The result of the analysis indicated that the experimental class achieved better than the control class in affective and psychomotor domains. The experimental students' affective and psychomotor scores were directly proportional to their cognitive achievement. Thus, it can be concluded that the Accelerated Learning Model with Prezi-assisted concept mapping has an effect on the eight-grade students' achievement in cognitive, affective, and psychomotor domains, especially in Motion System lesson.

Introduction

Learning is a process that involves student and teacher activities. All aspects of learning, from the beginning to the end of the process, are interrelated. Therefore, if one of the aspects cannot be accomplished, student achievement cannot be improved. Learning nowadays is still dominated by teacher-centered methods that are less appropriate with the objectives of learning. On many occasions, teachers mostly rely on the lecturing strategy, question and answer session, and classroom discussion so that the process of learning has not entirely focused on student practice or the development of students' ability in solving problems individually or in groups (Pramudiani, Widianti, & Peniati, 2014).

Observations conducted in SMP Negeri 3 Sekayu in April, 2017 revealed three primary methods used by the teachers to teach natural science; they are lecturing, question and answer methods, and classroom discussion. The implementation of these methods has resulted in the students' lack of enthusiasm and motivation in learning. As a result, the students became less active and less confident to ask questions. They were silent in the classroom because they were worried to share their opinions and problems in learning. In addition, it was found that some of the eight-grade students had not achieved the standard achievement of the Movement System lesson. Compared to other subjects, the students' scores on Movement System were far below expectations. Topics in Movement System that were difficult for the students to understand include skeleton names, types of joints, types of muscles, and types of bone disorders. This condition should be given more careful attention; otherwise, it is feared that the students may have difficulties studying and understanding more advanced concepts in the future (Adiguna, Suara, & Putra, 2014).

Syah (2010) states that learning models are one of the factors that can affect learning process. The existing methods of teaching need to be combined with learning models. Through the implementation of learning models in the classroom, it was expected that the students could achieve better in Movement System. Therefore, in this study, Accelerated Learning was implemented.

As the name suggests, Accelerated Learning accommodates acceleration in learning. Acceleration in this case refers to a strategy that allows students to progress faster in understanding learning materials, so learning becomes more efficient (Russell, 2011). A practical way to accelerate learning is through concept mapping. Concept mapping helps students remember information quickly and is more effective than note taking. Besides, the relational purpose of concept mapping is to show how cognitive knowledge is developed structurally by the students (Davies, 2011).

Since concept maps require visual and graphical patterns, Accelerated Learning using concept mapping can be facilitated by Prezi. Prezi is an internet-based software tool used in presentations. The ZUI (Zooming User Interface) feature in Prezi makes it easier for the user to focus more on the slide's sentences using dramatic and various motions (Brock & Brodahl, 2013). This feature can assist students in understanding materials presented on the slides (Aotar, Adlim, & Safrida, 2015) and can definitely make learning more fun. Therefore, it was expected that the implementation of the Accelerated Learning model with Prezi-assisted concept mapping could improve students' enthusiasm and motivation in learning which, in the end, had an effect on the students' learning achievement in Movement System.

The effectiveness of Accelerated Learning models has been studied by Cahyani, Dantes and Riastini (2014) and Nirfayanti and Juliana (2017) who showed an improvement in students' scores in Mathematics. Furthermore, Pramudiani et al. (2014) employed Accelerated Learning and puzzles as an approach to enhancing students' mastery of Movement System. Unlike the previous research, this study aimed to investigate the effect of Accelerated Learning with Prezi-assisted concept mapping on the eight-grade students' achievement in Movement System.

Method

A quasi-experiment with a control group pretest-posttest design was employed in this study. The experimental class was taught using Accelerated Learning with Prezi-assisted concept mapping, while the control class was taught using conventional methods (without any learning model combinations). The Accelerated Learning model consisted of several stages, including mind motivation, information acquisition, the search for meaning, memory trigger, exhibition of knowledge, and reflection (Rose & Nicholl, 2011).

Both the Accelerated Learning model and conventional methods treatments were given in two consecutive meetings for each class. A cluster random sampling technique was used to select the sample. The participants of the study consisted of 66 students from SMP Negeri 3 Sekayu registered in the academic year of 2017/2018. Thirty-three students from Class VIII.2 acted as the control group and thirty-three students from Class VIII3 acted as the experimental group. Research procedures involved school survey, preparation of learning tools, development of instruments to measure student

cognitive, affective, and psychomotor achievement, development of Prezi learning media, validation of the instruments, collection of the validation results, analysis of the validity and reliability tests data, administration of treatments, and data analysis.

Instruments used to collect the data were multiple-choice tests for cognitive achievement and observation sheets for affective and psychomotor achievement. The validity and reliability of the multiple choice tests were examined based on Rasch (Sumintono & Widhiarso, 2015). Item measure was used to investigate the difficulty level of each test item. Items were considered valid when they fulfilled two or three criteria of the item measure. The result of the validity test showed that out of 40 items that were tried out to 20 students, 17 were valid and 23 were invalid. The total number of items used in the test was 20 items. Therefore, the invalid items were revised before they were used in this study. The reliability of the multiple-choice tests was examined used summary statistic. Summary statistic was conducted to investigate the quality of student responses and the quality of the instrument as a whole. The reliability of the test items was categorized into good category with a score of 0.74. This figure suggested that the test items could be used to collect the data.

Table 1. Honesty and discipline assessment matrix

Aspect Observed	Indicator
Honesty	Does not cheat on exams
	Expresses feelings freely
	Reports a situation or a condition as what it is
	Admits one's mistakes or weaknesses
	Tells the truth to others
Discipline	Comes on time
	Complies with the classroom rules
	Completes tasks correctly and submits them on time
	Behaves properly during the lesson

(Hariadi, 2017)

Experts were invited to validate the observation sheets used to collect data on the students' affective (honesty and discipline) and psychomotor (creativity) aspects. While the affective domain was assessed based on indicators presented in Table 1, the psychomotor domain was evaluated based on the students' ability in creating a correct and original concept map.

Data on the students' cognitive achievement were analyzed using an independent sample t-test. The N-gain was obtained from the difference between the students' average pretest and post-test scores using the following formula and N-gain category was presented in Table 2 (Hake, 1998).

$$g = \frac{\text{posttest score } - \text{ pretest score}}{\text{maximum possible score } - \text{ pretest score}}$$

Table 2. N-gain category

Score Range	Category
$g \geq 0.7$	High
$0.7 > g \geq 0.3$	Medium
$g < 0.3$	Low

In the independent t-test analysis, H0 was rejected and Ha was accepted when significance levels (2-tailed) were greater than $\alpha/2$ (0.025). Prior to conducting the t-test analysis, data normality and homogeneity were examined using 1 Sample K-S and Levene test, respectively.

The normality test was conducted to investigate whether the data were distributed normally or not. Data were distributed normally and/or homogeneously when significance levels (2-tailed) were greater than or equal to $\alpha/2$ (0.025). Student achievement in affective and psychomotor domains was analyzed using the following formula.

$$\text{Final Score } = \frac{\Sigma \text{ respondent score}}{\text{maximum score}} \text{ x } 100\%$$

(Arikunto, 2013)

The final score was converted into percentage form and categorized into the following category (Table 3).

Table 3. Category of the affective and psychomotor scores

Percentage of the Final Score	Category
A = 81-100	Very good
B = 71-80	Good
C = 61-70	Average
D = 51-60	Poor
E ≤ 50	Very poor

(Modified from Arikunto, 2013)

Results and Discussion

The current study used multiple-choice tests and observations to collect the data on

student achievement in Movement System. The students' achievement was measured in three domains that are cognitive, affective, and psychomotor.

Student Cognitive Achievement in Movement System

The students' cognitive achievement was analyzed using N-gain score which indicated the difference between the post-test and pretest scores (Meltzer, 2002). The N-gain score was then used in normality, homogeneity, and independent t-test analyses. The category of the N-gain score can be seen in Table 2. The difference in the students' scores can be seen from the distribution of the scores obtained by the experimental class and control class (Table 4).

Table 4. Distribution of the N-Gain score frequency in the experimental and control class

N-gain		Frequency		Percentage	
EC	CC	EC	CC	EC	CC
0.3	0.09	1	1	3.0	3.0
0.33	0.11	2	1	6.1	3.0
0.37	0.12	1	4	3.0	1.1
0.44	0.14	1	3	3.0	9.1
0.45	0.2	1	5	3.0	15.2
0.5	0.25	3	1	9.1	3.0
0.54	0.27	3	5	9.1	15.2
0.55	0.33	1	1	3.0	3.0
0.57	0.36	3	2	9.1	6.1
0.6	0.37	3	4	9.1	12.1
0.62	0.42	1	1	3.0	3.0
0.63	0.5	1	2	3.0	6.1
0.66	0.58	2	2	6.1	6.1
0.7	0.66	2	1	6.1	3.0
0.71		1		3.0	
0.75		2		6.1	
0.8		2		6.1	
0.83		1		3.0	
0.85		2		6.1	
Total		33	33	100.0	100.0

EC: Experimental Class
CC: Control Class

Table 4 showed that the distribution of the N-gain score frequency in the experimental class was higher than that in the control class. The highest N-gain score in the experimental class (0.85) was obtained by two students with a percentage of 6.1%, while the lowest N-gain score in the experimental class (0.3) was obtained by one student with a percentage of 3.0%. Table 4 indicated that the highest (0.66) and the lowest (0.09) N-gain scores had the same percentage, that is 3.0%. The difference between the N-gain scores obtained by the experimental and control classes was depicted in Figure 1.
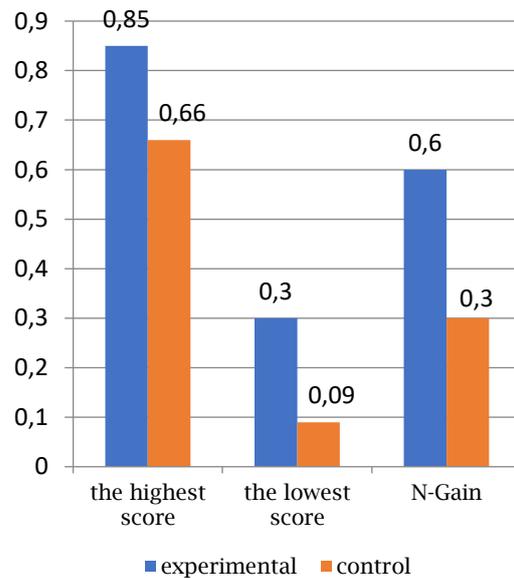

Figure 1. N-gain score difference between the experimental and control classes

Figure 1 showed that N-gain scores in the experimental class were higher than those in the control class. The highest N-gain score reported by the experimental class was 0.85, while the highest N-gain score reported by the control class was 0.66 The lowest N-gain score in the experimental class was 0.30, while the lowest score in the control class was 0.09. The average N-gain score obtained by the experimental class was 0.60 (average), while the average N-gain score obtained by the control class was 0.30 (poor).

The N-gain scores were then used in normality and homogeneity tests, that was a prerequisite for the independent t-test analysis. The significance value (2-tailed) of the normality test was $0.526 > \alpha/2$ (0,025). This figure suggested that the data were distributed normally. In addition, the significance value (2-tailed) of the homogeneity test was $0.819 > \alpha/2$ (0,025), that showed that the data were homogeneous. Because the parametric requirements had been fulfilled, an independent t-test could be performed to test the hypothesis "Accelerated Learning with Prezi-assisted concept mapping had an effect on the students' cognitive achievement in Movement System". The result of the independent t-test analysis can be seen in Table 5.

Table 5. The result of the independent t-test analysis

	t	db	Sig. (*2-tailed*)	Difference	Significance level of 95%	
					Lower	Upper
Cognitive achievement	8.310	64	0,000	0.31030	0.2357	0.38490

Table 5 indicated that Ha was accepted and H0 was rejected with a significance level (2-tailed) of 0.000 < α/2 (0.025). Therefore, it can be said that Accelerated Learning with Prezi-assisted concept mapping had an effect on the students' cognitive achievement in Movement System. This could happen because Accelerated Learning could awaken learners to their full learning ability. In Accelerated Learning, teachers act as facilitators and students can determine their own strategies to learn. Accelerated Learning is a means and a purpose (Serdyukov, 2008). Thus, Rose and Nicholl (2011) offers several steps (syntax) to achieve the Accelerated Learning purpose. In this study, Prezi-assisted concept mapping was used to help the students achieve the goal.

Prezi-assisted concept mapping assisted the students in receiving and remembering materials delivered through Prezi slides, animation videos, and images of human skeletons, types of bones, types of muscles and bone disorders. Prezi was used as a medium to improve student achievement. In line with Arsyad (2016), learning media can provide a psychological stimulation for students, so they can get more motivated and engaged in the lesson. In addition, learning media can also help students understand learning materials better and as a result improve their achievement.

Furthermore, the implementation of Accelerated Learning with Prezi-assisted concept mapping created a more systematic and fun learning process. Systematic learning involves a clear relationship between learning objectives, learning materials, learning process, and assessment. According to Taufiq and Husna (2013), Accelerated Learning is a pattern that can be designed to improve student learning motivation; thus, make learning more fun and more efficient. Prezi-assisted concept mapping is a fun learning activity that can be used to facilitate students' understanding of Movement System.

On the other hand, conventional methods used in the control class consisted of lecturing activity, question and answer session, and classroom discussion. In this type of classroom, the teacher was required to be more active than the students in delivering the materials to the students. Therefore, the students were less engaged in the lesson, less motivated, and less stimulated.

Lecturing is a method of explaining something verbally. In a lecture, the teacher asks questions and the students listen carefully to the teacher and take notes on important points when necessary (Hamdayama, 2014). This type of learning is commonly found in many classrooms and has existed since a long time ago. Because lecturing is never associated with any learning models or strategies, it is also known as No Name Learning or Anonymous Learning (Corebima, 2016).

Student Affective Performance in Movement System

The assessment of the students' affective performance in Movement System aimed to investigate the students' responses and reactions towards the learning process. Priyayi, Santosa and Probosari (2012) has found that Accelerated Learning also has a positive impact on students' attitude. Affective aspects evaluated in this study were honesty and discipline. The assessment results of the students' honesty and discipline were recorded in Table 6 and Table 7, respectively.

Table 6. Observation result of student honesty

Score	Remark	Percentage	
		Experimental (VIII3)	Control (VIII2)
81-100	Excellent	36.36%	33.33%
71-80	Good	51.51%	45.45%
61-70	Average	12.12 %	9.09%
51-60	Poor	-	12.12%
≤50	-	-	-

Based on Table 6, it was found that there was an improvement in the students' performance in honesty from meeting 1 to meeting 2. The experimental class reported scores between 81-100 (36.36%) as the highest score, 71-80 (51.51%), and 61-70

(12.12%) as the lowest score. On the other hand, 33.33% students from the control class achieved scores between 81-100, 45.45% achieved scores between 71.80, 9.09% achieved scores between 61-70, and 12.12% achieved scores between 51-60.

Student honesty was reflected in the following behaviors: the students did not cheat during exams; the students were able to express their feelings freely; the students reported a situation or a condition as what it was; the students gave an honest answer during discussions. Student honesty can also be seen from the originality of their mind maps. The authenticity of their work showed that the students worked on it by themselves.

Table 7. Observation result of student discipline

| Score | Remark | Percentage | |
		Experimental (VIII3)	Control (VIII2)
81-100	Excellent	45,45%	33,33%
71-80	Good	42,42%	36,36%
61-70	Average	12,12%	9,09%
51-60	Poor	-	21,21%
≤50	-	-	-

Table 7 indicated that the VIII.3 students performed better in discipline compared to the VIII.2 students. The result of the assessment showed that 45.45% students from the experimental class obtained scores between 81-100, 42.42% achieved scores between 71-80, 12.12% achieved scores between 61-70. On the other hand, 33.33% students from the control class were in excellent category (81-100), 36.36% were in good category (71-80), and 21.21% were in average category (61-70).

An improvement in the students' discipline, such as coming to the classroom on time, complying with the classroom rules, completing the tasks correctly and submitting them on time, and behaving properly during the lesson, occurred because the teacher constantly reminded the students to be discipline during the implementation of the Accelerated Learning model. In line with this finding, Elly (2016) argues that discipline is a management operative function of the entire organization including classroom management because students who are discipline can achieve better than those who are not discipline. Without good discipline, it is difficult for the students to achieve optimal learning outcomes. Discipline in

managing time for learning encourages students to achieve better learning outcomes. The making of Prezi-assisted concept maps also requires discipline.

Overall, the affective performance of the experimental class in honesty and discipline was higher than that of the control class. Honesty and discipline are the main elements of character education. As one attitude grows, the other can be be enriched as well (Judiani, 2010). Honesty and discipline attitudes owned by the students in the experimental class also fostered their enthusiasm and creativity (Table 8) and improved their cognitive achievement (Figure 1). The Accelerated Learning with Prezi-assisted concept mapping required the students to conduct honest and discipline learning based on its syntax, meanwhile the control class was not taught with any specific learning models or strategies (No Name Learning or Anonymous Learning) (Corebima, 2016). As a result, the students in the control class failed to develop honesty and discipline during the learning process.

One of the fundamental principles of Accelerated Learning is to develop students' positive emotions. Feelings determine the quality and quantity of one's learning. Negative feelings hinder learning. Positive feelings accelerate it. Students who learn in a stressful, painful, and depressing learning environment cannot surpass those who learn in a fun, relaxing, and engaging learning atmosphere (Meier, 2013). The formation of students' positive emotions starts from the teacher. Therefore, the teacher must first develop positive emotions before teaching them to the students (Rose & Nicholl, 2011).

Student Psychomotor Performance in Movement System

The assessment of the students' performance in psychomotor domain aimed to examine the ability of the students to apply their knowledge in various contexts. The students' psychomotor performance in this study was evaluated based on their creativity in drawing a mind map. The evaluated aspects covered the accuracy and originality of the mind map. The result of the students' psychomotor assessment was presented in Table 8.

Table 8 showed that the 51.51% students from the experimental class achieved excellent scores in creativity, 33.33% obtained good scores, 15.15% obtained average scores. On the other hand,

there were 54.54% students from the control class who obtained good scores, 39.39% obtained average scores, and 6.06% obtained poor scores in creativity.

Table 8. Observation result of student creativity

| Score | Category | Percentage | |
		Experimental (VIII3)	Control (VIII2)
81-100	Excellent	51,51%	-
71-80	Good	33,33%	54,54%
61-70	Average	15,15%	39,39%
51-60	Poor	-	6,06%
≤50	-	-	-

Therefore, it can be concluded that the students from the experimental class achieved better than the students from the control class in creativity. Concept maps are the realization of student creativity in the experimental class that was taught using Accelerated Learning. Concept maps reflect the steps to Accelerated Learning that consists of information acquisition, memory trigger, exhibition of knowledge, and reflection. This finding is corroborated with Davies (2011) who states that concept mapping can be used to create idea association and retain student memory. Moreover, Prezi-assisted concept mapping used in the experimental class was a practical medium to improve students' understanding of the materials.

Creativity is one of the important aspects that need to be achieved in learning (Sholihah, 2015). Mind mapping allows students to express their mastery and understanding of concepts in the form of interesting and creative patterned notes. Creativity has a relationship with cognitive learning outcomes (Silaban & Napitupulu, 2012). The creativity performance of the experimental class had a linear relationship with their cognitive achievement, which was higher than that of the control class (Figure 1). This finding is in line with those of Widyasari, Sarwanto, and Prayitno (2013) who found that creativity had a significant effect on cognitive achievement. Conversely, the absence of learning media in the control class resulted in the students' poor performance in creativity or in psychomotor domain. Besides the absence of the media, the control class was also taught with conventional methods (No Name Learning or Anonymous Learning (Corebima, 2016)) that were not associated with any specific learning models or strategies that can be used to improve students creativity.

Conclusion

The result of the independent t-test analysis showed a significance level (2-tailed) of $0,000 < \alpha/2$ (0,025), indicating that Accelerated Learning with Prezi-assisted concept mapping had an effect on the eight-grade cognitive achievement in Movement System. Furthermore, the result of the assessment of the students' affective (honesty and discipline) and psychomotor (creativity) aspects also indicated that the experimental class performed better than the control class. The affective and psychomotor performances of the students from the experimental class had a linear relationship with their cognitive achievement. Therefore, it can be concluded that the Accelerated Learning model with Prezi-assisted concept mapping had an effect on the cognitive, affective, and psychomotor performances of the eight-grade students from SMP Negeri 3 Sekayu.

Acknowledgment

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