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ENHANCHING THE LEARNING QUALITY OF DYNAMIC ECOSYSTEM IN BIOLOGY AT THE MRSM FELDA MALAYSIA WITH NUMBERED HEAD TOGETHER (NHT) METHODS USING SMART CARD AND MULTIMEDIA BASED LEARNING

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ABSTRACT

Based on the observation data of the student achievement of the Dynamic ecosystem Form 4 MRSM Felda (Trolak) Malaysia in academic year 2013/2014 got information that there are 106 students from 175 students or 60.56% of students who received grades under the minimal criteria score. While the average value of the ten classes is 66.67. Minimal Criteria Score value for Biology subjects in MRSM Felda (Trolak) Malaysia is 76 or B. This indicates that MRSM Felda student achievement in the subject matter of Dynamic ecosystem is lower than Minimal Criteria Score. Based on the observation result among students boring to learn biology because the methods that the teacher used is only explanation methods that make student boring in the class, so it is needed a methods that could solve those problems, to enhanching the learning quality of biology. The aim of this study is determine the effectivity of cooperative learning methods Numbered Head Together (NHT) using Smart Card and multimedia based learning on student achievement of Dynamic ecosystem in Form 4 MRSM Felda (Trolak) Malaysia. Methods: This research using experimental research with pretest post test control group design as many as 66 students on 2 class. Analysis method using t-test, and qualitatively. The result of this study show that Numbered Head Together (NHT) learning method using Smart Card and multimedia effective to increase the student achievement and affective aspect on biology in MRSM Felda (Trolak) based on statistics methods on student's achievement ($t = 3{,}102$; $p<0{,}05$) and student's affective aspect ($t=3{,}56$; $p<0{,}05$).

Key Word: learning quality, Number Head Together, multimedia, MRSM Felda , smart card.

INTRODUCTION

Integrated Curriculum for Secondary Schools I is the Education curriculum in Malaysia that specified into various subject and level, one of them at the high school level as Biological science. Malaysian school biology curriculum aims to develop the knowledge, skills and positive attitudes of students (Roderick et al., 2010). Biology in secondary schools that provide opportunities for students to gain knowledge and develop problem-solving skills of biology in higher level, and decision making skills that help students resolve everyday problems. Biology curriculum aims to grow the value of love to the state in building a comprehensive human being who seeks to contribute towards the harmony and prosperity of the country and its people (Ibrahim, 2000 and Lago et al., 2007) . Broadly speaking Biology studied the facts and seek and develop a theory that can explain the facts of the environment. Therefore, in the learning process, presentation of the material needs to be made so attractive and fun so that students are able to understand the concept independently.

One of the subject matter in the curriculum of Malaysia in Biology is Dynamic ecosystem that learned by the students on Form 4 secondary schools. The characteristics of this material is mostly in the form of concept and require a high level of understanding in the study, because in studying the ecosystem necessary understanding of the causal mechanisms and the energy pyramid. It is indirectly demanded Dynamic ecosystem learning material should be able to present the concept an interesting and using student-centered approach. But most of the learning process on the material Biology is not entirely student-centered. Based on data from the

student achievement of the Dynamic ecosystem Form 4 MRSM Felda (Trolak) Malaysia 2013/2014 school year obtained the data that there are 106 students from 175 students or 60.56% of students who received grades under the minimal criteria score. While the average value of the ten classes is 66.67. Minimal Criteria Score value for Biology subjects in MRSM Felda (Trolak) Malaysia is 76 or B. This indicates that MRSM Felda student achievement in the subject matter of Dynamic ecosystem is lower than Minimal Criteria Score.

Based on interviews with teachers of Biology and observation in MRSM Felda (Trolak) Malaysia, learning method which has been used is the conventional method of explanation by teacher and discussion. However, use of this method is less effective because the students are sleepy, talking with friends and less attention to the teacher. This caused by the domination by teachers so that students become passive, bored in the learning process in the classroom, especially in the matter of Dynamic ecosystem as well as the material obtained by the students was limited and the result of student achievement is low. Student achievement is still under minimal criteria score in the subject matter of Dynamic ecosystem may be caused by the use of learning methods according to student characteristics and materials. Therefore, to overcome the material requires an understanding of the concepts necessary appropriate learning method. One method that can be used is the type of cooperative learning methods Number Head Together (NHT).

Syntax of NHT cooperative learning methods are numbering, ask questions, think together and answer questions (Budget et al., 2010 and Purnamasari, 2013). With the numbering, all the students are required to be ready and active in teaching and learning activities (Apriandi, 2012). Although it has advantages NHT method also has its disadvantages if not using instructional media. To overcome the disadvantages of this method so it is used Smart Card and multimedia in learning. Smart Card used in this study is a card containing a summary or the main points of the learning material so that the learning process is more effectively. With the advantages possessed by the Smart Card media, the student is expected to easily understand the concepts of the material presented by the teachers and students become more motivated to learn. Results of research conducted by Megawati (2010) explained that the Smart Card media can enhance students' ability on kognitive aspect. While the multimedia functions as a media to facilitate learning in a competition between groups. With the multimedia, students are trained to do the exercises while discussing with the group to enhance students' understanding of the material presented by the teacher. So, with the use of cooperative learning NHT method that using Smart Card and multimedia is expected the student achievement will increase.

The aim of this research is to know the effectivity of number head together learning methods using smart card and multimedia on student's achievement to enhanching the learning quality of Biology.

METHODS

This research conducted on MRSM (Maktab Rendah Sains Mara) Felda (Trolak) that located on Perak Regency, Malaysia using expetimental research. The design of the research is "Randomized Control group pretest-posttest design" that presented in Table 1.

Table 1. "Randomized Control group pretest-posttest design"

Group	*Pretest*	*Treatment*	*Postest*
Experiment	Y1	Xa	Y2
Control	Y1	Xb	Y2

Smart Card and multimedia was given at a meeting of the 2nd to 4th meetings and implement Xb treatment, in the other hand in the control of the use of explanation and discussion with Students Worksheet (2nd meeting to meeting 4th), then in determining the student's achievement and affective student after being treated Xa in the experimental class of the cooperative learning methods Numbered Head Together (NHT) used with Smart Card media and multimedia and Xb on grade control of the use of explanation and discussion with Students Worksheet by providing Y2 and cognitive aspects postest as affective aspects of the experimental class and control class (7th meeting), then determined the difference in value pretest posttest between Y1 Y2 and student's achievement of the experimental class (Z1) and the control class (Z2), determines the ratio of the difference between pretest and posttest values cognitive and postest value of affective aspects in the experimental class and control class to determine the differences by histogram comparison of learning achievement experimental class and control class, and then conduct analysis prerequisite test (test for normality) and hypothesis test (t test).

This study population is a Form 4 student which consists of 9 classes. The sampling technique used in this study is a cluster random sampling of the 9 classes in Form 4 conducted randomly taking two classes to be used as a sample of Form 402 as the control class and

Form 401 as experimental class, each class consists of 33 students with consideration of both classes have average achievement or almost same.

Data Collection Methods : (1) Data of improving student's achievement got from the pretest and post-test, (2) Data of student and teacher responses to the a learning methods and media was collected using a questionnaire, (3) Data of student activity (affective aspects) are taken from the observation of students conducted by observers.

Instruments in this study were classified into two: instruments of learning and assessment instruments. learning Instruments including syllabus, lesson plans and instructional media (*Smart Card* and multimedia) while the assessment instruments include instruments of student's achievement (objective test) and affective (questionnaire). The necessary data were analyzed using t-test. Therefore the analysis prerequisite test normality test. Normality test used is a test Liliefors (Budiyono et al., 2009). Then for The effectivity of the Number head together with smart card and multimedia is known from the results of post test and affective aspect. The data analyzed by t-test.

RESULTS AND DISCUSSION

3.1 Data of Student's achievement

The Data of student achievement in experimental and control classes are presented in a histogram comparison of student's achievement in Figure 1.

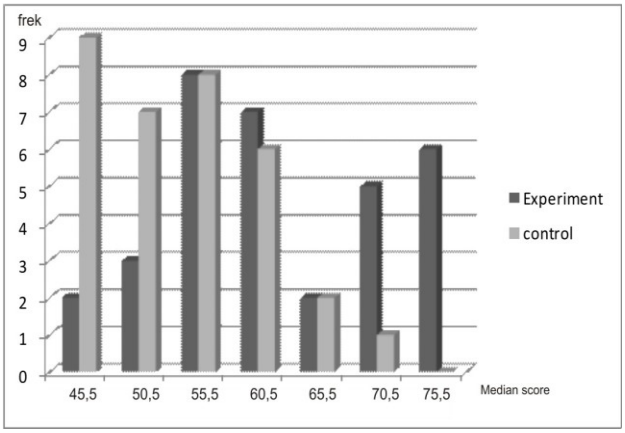

Figure 1. Student's achievement of experiment and control class

Based on data in Table 4 known that student's achievement (the difference between pretest and posttest) on the experimental class and the control class. Student's achievements in experimental class is mostly higher than control class. Based on the results of analysis using the t-test showed that there was a significant difference between the student's achievement of control group and an experimental group with the t-test on learning achievement is = 3,511> t table = 1.645. More t test results are presented in Table 8. While the result of affective aspect presented on figure 2.

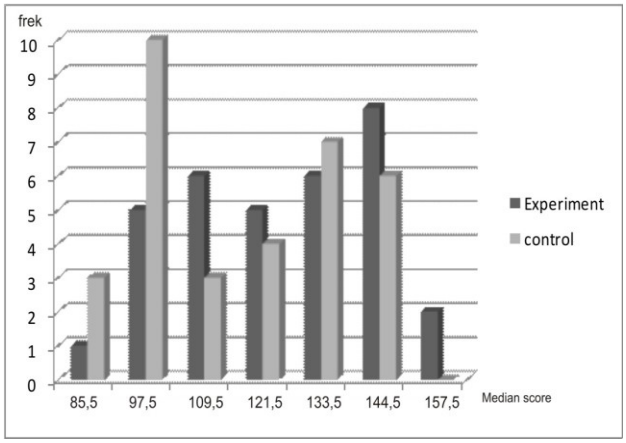

Figure 2 Histogram Comparison Value of Affective Aspects in Dynamic ecosystem for Experimental Class and Controls Class

3.2 Normality Test Results

Normality test is used to determine whether the sample that used for the study has distributed normally population or not. In this normality test used Liliefors test with significance level of 5%. Normality test results of cognitive achievement are presented in Table 2.

Table 2. Normality Test Results Student Achievement

Class	Sample count	L values	
		Table	Result
Eksperiment	33	0,1610	0,1520
Control	33	0,1610	0,1520

Based on the normality test that shown in table 2 the data is distribute normally. The effectivity of the number head together using smart card and multimedia is known from the result of the difference between pretest and postes that higher (better) in the control group. t-tests were performed with SPSS version 15, if t-count <ttable Ho accepted and if t-count > t table H0 rejected. t-test results to student student's achievement data showed t-count on learning achievement is = 3.511 > table = 1.645 Thus student's achievement experimental class is higher than the control class student's achievement (Table 8). T test results to the data affective show t-count is 2.06 and ttable value is 1.645. So the activity of the experimental class students is higher than the activity control class. Based on the data above it can be concluded that innovative experiment guide effective to improve

student's achievement and affective aspect. T- test analysis results are presented in Table 3.

Table 3. Results of the analysis of the data using the t test for student's achievement and affective aspect in experimental and control class.

t-test	Different average	t value
Student's achievement of Experiment class	33,5	t-count: 3,511 t-table: 1,645
Student's achievement of control class	23,6	
Affective aspect of Experiment class	120,5	t-count: 2,06 t-table: 1,645
Affective aspect of control class	105,6	

3.3 Data of students Response for number head together teaching methods implementation using smart card and multimedia

The response of students to number head together using smart card and multimedia just given to the experimental class. This is because this methods only used in the experimental class. Student response data shown in Table 4.

Table 4. Students' responses for the teaching methods

Response Criteria	Total students	Percentage (%)
High	28	84.84
Medium	5	15.15
Low	0	0

From the data in Table 4 can be seen that most of students experimental group provides a high-level response to number head together using smart card and multimedia. This means that students give positive respond to the use of number head together using smart card and multimedia learning process.

3.4 Disscussion

Based on the data of study, the average of students achievement increase on experimental class is higher than the control class. This is because learning in the classroom experiments that using Smart Card and multimedia more attractive than the control class that only uses explanation methods. The learning quality is effected by some factors such as the quality of teacher, spirit of students, source of lerning, and media that used. One of the learning methods that used in this experiment to enhanching lerning quality is NHT using smart card and multimedia. Smart Card is a card that contains a summary of the subject matter or the Dynamic ecosystem that is presented in an interesting and practical so that with the Smart Card's media students easily understand the concepts in Dynamic ecosystem material presented by teachers and students become more motivated to learn so fast learning goals reached. Smart card in this experiment is used competition between groups to search the pair which suitable answer. The first card is the word on dynamic ecosystem, while the pair is the definition. An example of smart card is shown in Figure 1

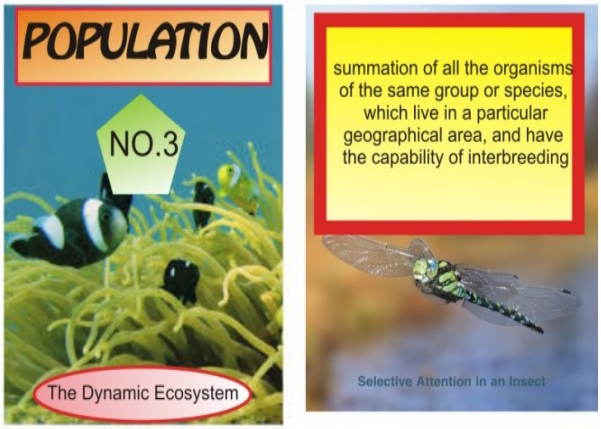

Figure 3. Smart Card that used in number head together teaching methods

Based on the analysis of the student's achievement and affective aspect this methods effective to use in teaching and lerning activities. This result is also supported by research of Megawati (2010), which explains that the Smart Card media can be enhance students' ability cogintively because the use of the Smart Card is in accordance with the conditions of cognitive development of students, because it present abstract concepts.

In addition to using a Smart Media Card, experimental class also use multimedia. Multimedia has a special function in the form of visualization, so that students get more real information (Ritonga, 2009). It is intended that the cooperative learning NHT methods become more effective. In line with the research of Munawar (2009) which concluded that the application of multimedia on cooperative learning can enhance the learning process and learning outcomes on student Statistics especially in the school.

For affective aspects of students' learning achievement, the average value was 117,7 affective experimental class and the control class is 106.6. Based on the results of t-test analysis, student affective aspects of the experimental class and control class get t = 2.0 greater than the t-table = 1.6, so it can be concluded that

the affective aspects of learning achievement for students in the experimental class higher than the control class. Affective assessment was conducted to determine students' attitudes toward learning process. In addition, affective assessment is useful to measure the level of activity and attitudes after get learning in class. Affective aspects concerning attitudes, interests, self-concept, values and morals of students. A student will be difficult to achieve optimum learning success if the student does not have an interest in the subject so that it can be seen that the competence of the students in the affective aspects into supporting the success in other aspects of learning, because main aspect of learning beside kognitive is also affective aspect.

According to Purnamasari (2013), the use of cooperative learning model NHT provides a better learning achievement than learning model 'make a match' and according to Apriandi (2012) NHT method is more effective than the Two Stay-Two Stray (TS-TS). In accordance with the cognitive theory of cooperative learning model that emphasizes the influence of cooperation in an atmosphere of togetherness within the group itself. According to Parveen (2012) , "cognitive theories emphasize the effects of working together in itself (Whether or not the groups are trying of group goal". On the cooperative learning model, it will not be seen students who are working on their own without the help of a friend, because in each model belonging to the cooperative learning everything prioritize cooperation or teamwork in students' worksheets. This is consistent with the hypothesis, and Woods et al., (2010) which states: Cooperative learning is an instructional models in the which student work together toward a common goal. Clearly Research has shown that cooperation results in higher levels of achievement. Although students may be a part of a cooperative learning environment, they are Also responsible for Reviews their own individual achievement. This makes student evaluations a chalenge Because Evaluating individual as well as team effort. NHT superior, because the interaction between the students through a discussion in solving the problems faced, and students proficient or weak students alike benefit through cooperative learning activities (Utami, 2011).

Besides that teaching and learning on experimental class lasted two directions and centered on students when compared with the control class. This impact on the students of experiment class clearly become more active and interested in the learning process. Besides learning that takes place in both directions, with the calling group members could be expected to make a certain number of students in the experimental class, active and focus group discussions and spirit to winning the competition. While learning in the classroom on control lasted one direction even though there are discussion groups. Learning in control class use the teacher explanation method. It is suspected can lead to students being passive, sleepy time of learning and lack of understanding as well as teacher-centered. It has also supported by research of Hunter et al., (2012) which states that the NHT type cooperative learning methods can increase participation and activities of students in the learning of mathematics. consequently math scores of students be increased. It is also supported by the research of Parveen and Batool (2012), Akhtar, 2012, and Mahaendy (2006) which concluded that cooperative learning is better than traditional learning. This is indicated by the results of the students in the classroom posttest experimental use of cooperative learning proved higher than the control class that uses traditional methods.

Based on all analysis above it can be seen that the cooperative learning methods NHT with Smart Card and multimedia can help students to understand the concept of Dynamic ecosystem. This is evidenced by student achievement on both experimental class of cognitive and affective higher than the control class. Therefore Numbered Head Together (NHT) with Smart Card and multimedia effective to improve student achievement in the subject matter of Dynamic ecosystem Form 4 MRSM Felda (Trolak) Malaysia.

CONCLUSION

Based on the results of research and discussion, can be concluded that the`leraning methods of number head together using smart card and multimedia effectively to improve student's achievement and affective aspect of the students in MRSM Trolak Felda Malaysia on Dynamic Ecosystem, so this methods could enhanching the learning quality of biology learning process.

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