



Improvement of Biology Learning Interest on High School Cross-Interest Program by Rangkapantas

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Abstract

Teaching cross-interests Biology lessons in social sciences class for the researcher is a challenge. The purpose of this study is to determine effectiveness and efficiency of learning using "RANGKAPANTAS" (*Alat Gerak Rangka Setiap Organ dari Kertas*) innovative teaching aid on students' interest and learning outcomes and support teacher professionalism. This study was a classroom action research. The research subject was XI IPS 2 class semester 2, 2021/2022. Students' activities towards Biology lesson increased by 18% from Precycle to Cycle I and 11.85% from Cycle I to Cycle II. Learning activity in teaching and learning process from Precycle was 68.44% and it increased to 74.59% during Cycle I and to 86.44% during Cycle II. It showed that students' interest in Biology class has raised. Achievement level of student scores observed during Cycle II compared to Cycle I, had significant increase. The lowest score increased 33.3% from 60 to 80. The highest score increased 20.23% from 84 to 97 and the average score increased 21.25% from 70 to 87. Learning using "RANGKAPANTAS" with discussion learning method and presentation technique is proven to be effective and efficient in increasing the students' interest and learning outcomes as well as improving Biology teachers' professionalism.

Keywords: RANGKAPANTAS, activities, students' interest, learning outcomes

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INTRODUCTION

Teaching cross-interests Biology lessons in social sciences class for the researcher is a challenge, as the high responsibility to promote students' competence (Government of Indonesia, 2014). Problems found in SMAN 1 Temanggung, especially Biology lesson in XI IPS 2 class was less conducive, less cooperative, and less attentive; 4 male students were noisy; 3 female students talked a lot during class, 3 students were sleepy; and the learning duration became shorter than before, from 45 converted to 30 minutes.

In Biology, especially in the concept of Movement System and sub-concept of Skeletal System. With proper learning, students are expected to understand correctly about anatomy, function, and bone diseases. For learning, a model is needed as a skeleton visualization. The researcher tried to innovate teaching aid in the form of the skeleton of each organ using paper and named it as Skeletal System of Each Organ Using Papers or *Alat Gerak Rangka Setiap Organ dari Kertas* (RANGKAPANTAS)".

According to Soelarko in Sari (2022), teaching aids are tools or physical objects that can be perceived by five body senses to assist teachers to convey learning materials to students in the teaching and learning process. There are five main functions of teaching aids proposed by Sudjana (2009), namely as tools to create an effective teaching and learning situation, an integral part of the overall teaching process. Teaching with visual aid was also proven to increase students' interest and learning outcomes (Hartati, 2021; Ginting & WH, 2022)

Usman in Ryan & Zulfah (2021) states that the notion of learning interest is relevant attention towards a lesson which then encourages individuals to study and pursue the lesson. Effective teaching and learning process is indicated by the interest and attention of students in learning. Learning interest has huge influence on learning because anyone will do things that is interested for him/her (Ambarwati, 2020).

In Curriculum 2013 Article 1 Section 4, cross-interest is a curricular program provided to expand the students' choice of interest, talent, and/or academic skills. Learning outcomes are learning statements as one entity, not partial, which refers to the curriculum (Wahyuni & Munthe, 2014).

From the description above, it is important to conduct this research since there were problems related to students' interest of XI IPS 2 class semester 2 of the academic year 2021/2022 in Biology lesson on the concept of Movement System and sub-concept of Skeletal System. The purpose of this current study was to determine the extent to which learning using RANGKAPANTAS could increase students' interest; determine the extent to which learning effectiveness and efficiency can improve learning outcomes of XI IPS 2 class semester 2 of the academic year 2021/2022 and increase teacher professionalism in implementing effective and efficient teaching learning process to increase students' interest in learning the concept of Movement System and sub-concept of Skeletal System. Effective and efficient teaching learning process by RANGKAPANTAS would save teachers' energy and time. Benefits for students are to increase learning interest and its application in daily life, good communication and friendliness among students. Meanwhile, benefit for school is to improve services for students.

RESEARCH METHOD

This research was conducted in XI IPS 2 class semester 2 of the academic year 2021/2022 of SMA Negeri 1 Temanggung, with its address at Jl. Kartini 04 Temanggung. The researcher chose this XI IPS 2 class because the students' interest towards Biology lesson at this class was low. This Classroom Action Research in semester 2 of the academic year 2021/2022 with face-to-face learning started from March 1, 2022 to May 20, 2022, while report writing was conducted from May 30, 2022 to July 11, 2022.

The period of data collection was carried out during 3 weeks, from March 14, 2022 to April 01, 2022. The period of data collection was conducted together at the same time with the active teaching and learning process, so it did not interfere schedule of other subjects. The evaluation of Cycle 1 was carried out after all data (empirical and observational) have reached a conclusion, then used as a basis for carrying out actions in Cycle II.

The data were collected by using questionnaires, discussion with colleagues, and research report writing. The research subjects were students of XI IPS 2 class of SMAN I Temanggung semester 2 in the academic year 2021/2022 with 32 students consisting of 16 male students and 16 female students.

The objects of this research are interest, activities, enthusiasm, seriousness, comfort, joy, scientific communication skills, and the development of students' understanding in Biology lesson, particularly on the concept of Movement System and sub-concept of Skeletal System.

There are 2 types of data, namely quantitative and qualitative data, and the amount of data is 3, namely Precycle, Cycle I and Cycle II. To collect data, the researcher used survey technique before the cycle was started. Observations were made in Cycle I and Cycle II, focused on the learning process using "RANGKAPANTAS" to observe the entire teaching learning process related to students' interest when using "RANGKAPANTAS". Questionnaires asking about students' interest were given to students at the end of Cycle I and Cycle II. As a data collection tool, the researcher used questionnaire instruments about student activities, daily tests in Cycle I and Cycle II,

Data Analysis

The researcher used data triangulation technique. Data were taken from sources consisting of subject source and other sources. After the data were collected, they were then analyzed. The researcher used comparative descriptive in analysis, followed by data reflection by comparing Precycle, Cycle I, Cycle II in descriptive-comparative,

Indicator

The success indicator of this Classroom Action Research is when students can prove the effectiveness of the use of "RANGKAPANTAS" teaching aid with a significant increase in learning interest and learning outcomes, which can at least reach the minimum completeness criteria of 75 (75%),

Research Procedure

This research procedure is by using Classroom Action Research (CAR) (Meesuk et al., 2020) with research procedures covering two cycles. Each cycle consists of stages of planning, reacting (implementing), observing, and reflecting with the following steps:

1. Planning

Planning includes four stages, namely the preparation of researcher in designing a learning framework using "RANGKAPANTAS". In cycle I, students were given a questionnaire about the students' interest and activities in Biology lesson, then the students were given a task to study the material on the concept of Movement System and sub-concept of Muscles using pictures, the teacher formed groups of 4 or 5 students, discussed about muscles, presented in front of the class using pictures of muscles, questions and answers session, and quizzes or exercises about muscles.

In Cycle II, students were given a task to study the concept of Movement System and sub-concept of Skeletal System, the teacher formed a group of 5 or 4 students and assigned a task to make "RANGKAPANTAS" teaching aid and to study "RANGKAPANTAS" which was assigned, then followed by discussion and identification of the skeleton to be presented, questions and answers session, do practice questions and tests on the skeleton. After collecting daily test of Cycle II, students were given a questionnaire about their interests and activities in Biology lesson.

2. Implementation

The actions carried out in each cycle were Cycle I which was carried out in 4 learning hours where in 1 learning hour equals to 30 minutes with the following steps: Planning Phase in Cycle I was carried out in the learning process (1) Prepare lesson plan for the concept of Movement System and sub-concept of Muscle, (2) Prepare tasks or assignments that would be given to students, i.e. to study learning materials about muscles, (3) The equipment used is muscle pictures, (4) Practice questions about the Movement and Muscle System, (5) Prepare the student observation sheets to determine interests or activities, (6) Prepare assessment sheets of teaching learning process by peers

RESULTS AND DISCUSSION

The results of this classroom action research were obtained from the description of the Precycle, actions of Cycle I and Cycle II.

Description of Precycle

The condition during the previous learning process of the concept of Human Digestive System, students were not able to complete the questions correctly, there was no interaction among students, the students tended to be passive, only took notes and listened, some students were sleepy, and there was no use of technology. Students of XI IPS 2 class semester 2 in the academic year 2021/2022 when teaching learning process was conducted conventionally, activity data was obtained as in Figure 1.

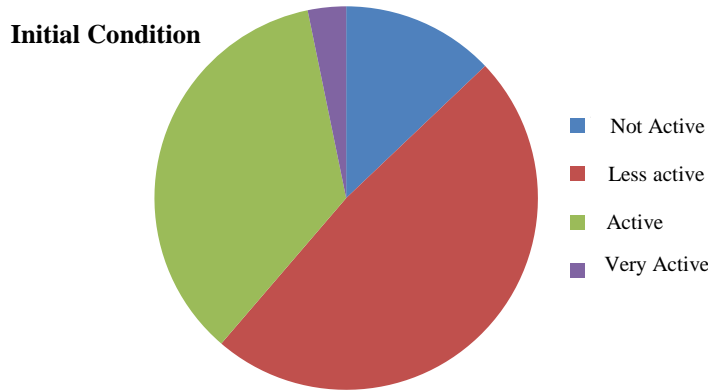


Figure 1 Students' Activities During Precycle

Score of daily test during Precycle on the concept of Human Digestive System is in Table 2. In the Precycle of teaching and learning process of Biology lesson on the concept of Digestive System in XI IPS 2 class semester 2 of the academic year 2021/2022, students showed low learning activities and communication skills, students tended to be passive and did not participate, only listened and answered questions if appointed, and the learning process was teacher-centered. Considering the low students' learning interests and low learning outcomes for the Human Digestive System concept as in Table 1, efforts were needed to provide a better new learning environment.

Table 1 Daily Test Score during Precycle

No	Score Criteria	Daily Test Score	Number of Students	of Score Range	Number of Students
1	Lowest Score	50	3	50 - 74	28
2	Highest Score	84	1	75 - 80	3
3	Average Score	64	5	81 - 100	1
4	Mean	65.281			
	Range of Values	34	% Completeness		32
			6.25		

Description of Cycle I

Teaching and learning process in Cycle I discussed about the concept of Movement System and sub-concept of Muscles. Questionnaire Results on Students' Activities during Cycle I is represented in Figure 2(a).

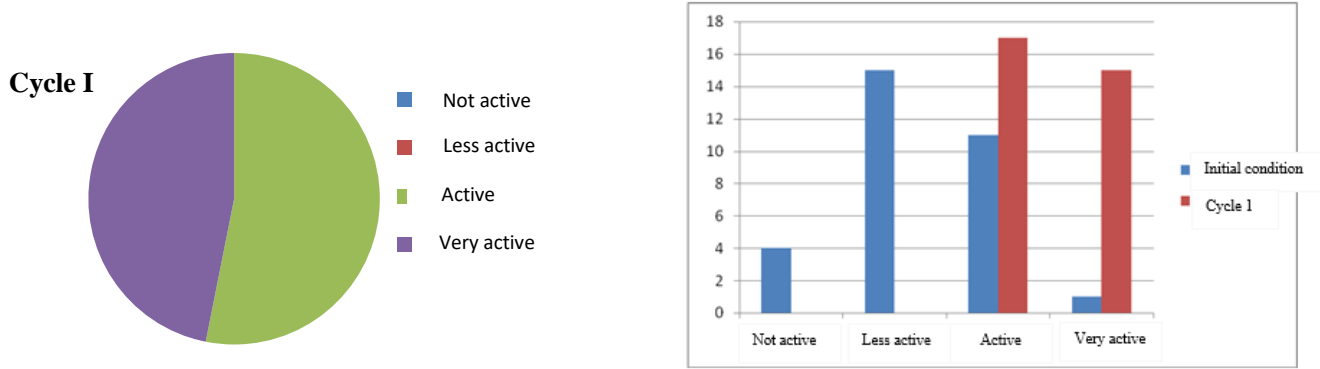


Figure 2 (a) Students' Activities During Cycle I, (b) Comparison of students' activity between Precycle and Cycle I

Table 3 Comparison of Students' Activities between Precycle and Cycle I

	Not Active	Less Active	Active	Very Active
Precycle	4	15	11	1
Cycle I	0	0	17	15

In Cycle I of teaching learning process on the concept of Movement System and sub-concept of Muscles used muscle pictures as visual aids. The implementation of teaching learning process employed discussion method and presentation technique. During the teaching and learning process, there was an increase in communication while students were discussing, presenting, asking questions, increasing interest and activities. It is in accordance with what was stated by Sudjana (2005) and Arsyad (2011), teaching aids as audiovisual tools which can be observed by the eyes and ears, are tools used by teachers to clarify subject matter, prevent verbalism and visualize concept which is difficult to envision, until it seems clear and students can understand the lessons better and increase the perception. Comparison between Precycle and Cycle I are shown in Table 3-4 and Figure 2(b)-3.

Table 4 Daily Test Score during Cycle I

No	Score Criteria	Daily Test Score	Number of Students	of Score Range	Number of Students
1	Lowest Score	60	1	60 - 74	9
2	Highest Score	84	2	75 -100	4
3	Average Score	70	5	61 - 75	19
4	Mean	76.25			
	Range of Values	24	% Completeness		32
			56.25		

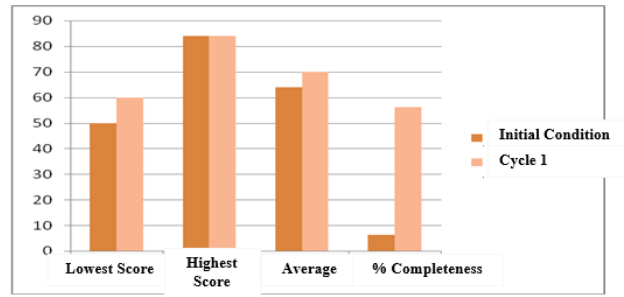


Figure 3 Comparison of Students' Scores between Precycle and Cycle I

To synchronize the results of students' thinking, the researcher also applied the discussion method in accordance with Anitah (2009) that the discussion method is a way of teaching which discusses and presents the material through a problem or question that must be resolved based on shared opinions, exchanged ideas, and preparation of presentation materials.

During the Cycle I of teaching and learning process, students experienced increased activities, as they seem to be happier and more cheerful. There was cooperation in group discussions and during presentations as they were more serious in learning. Students' interest on the concept of Movement System had increased, as in the Precycle, the number of students who were not active were 4 and less active were 15, became 0 (zero) in Cycle I. In the Precycle there were 11 active students, and it grew into 17 in Cycle I and became 5 in Cycle II. While there was 1 student who was very active in the Precycle, then it turned out to be 15 students in Cycle I and it became 27 students in Cycle II.

The percentage of students' activities towards learning Biology from Precycle to Cycle I increased by 6.15%, from 68.44% in the Precycle to 74.59% in Cycle I, indicating that students' interest in Biology lesson had increased. There were still 4 students who talked to each other when other groups presenting, 3 students who were sleepy and 3 students who did not pay attention.

Through the teaching and learning process, it was found that the achievement level of students' completeness scores with minimum completeness criteria of 75 on the concept of Movement System and sub-concept of Muscles, when compared to the Precycle, underwent a significant increase. Those who scored 75 or more were 56.25%. In comparative descriptive: The lowest score increased by 40%, from 40 to 56. The highest score remained at 84 and the mean value increased 9.3% from 64 to 70. Considering there were still students who had not paid well attention to learning process and learning outcomes that still needed to be improved, it was necessary to take corrective action for teaching and learning process in Cycle II.

Description of Cycle II

Teaching and learning process in Cycle II is learning procedures using "RANGKAPANTAS" teaching aid, by applying discussion method, presentation techniques and accompanied by practice questions. Observations during Cycle II were carried out by 2 people, the researcher and an observer, observing students' activities while peer observer examined the activities of teacher, researcher and students. Questionnaire Results on Students' Activities during Cycle II and its comparison to Cycle I are shown in Table 5 and Figure 4 to represent the improvement.

Table 5 Comparison of Students' Activities between Cycle I and Cycle II

	Not Active	Less Active	Active	Very Active
Cycle I	0	0	17	15
Cycle II	0	0	5	27

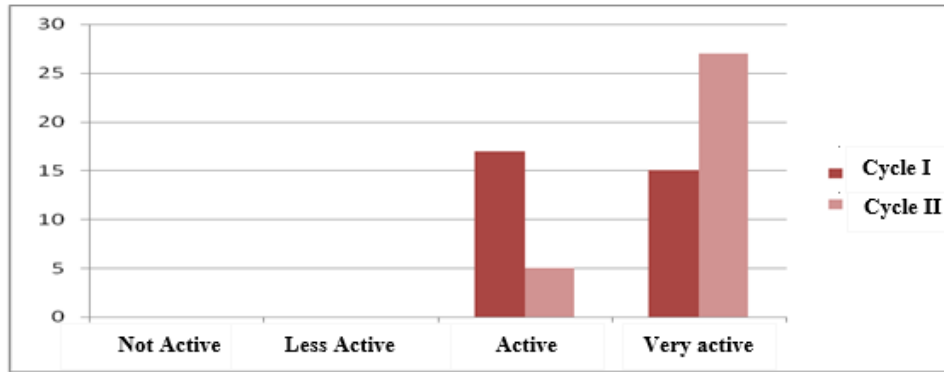


Figure 4 Comparison of Students' Activities between Cycle I and Cycle II

In the Cycle II of teaching and learning process by using RANGKAPANTAS teaching aid in accordance with the theory proposed by Sudjana (2005), the main function of teaching aids is as a tool to create an effective teaching and learning situation; its use is integral to the objectives and content of the lesson; not only as a means of entertainment or complement; prioritized to accelerate teaching and learning process; assist students in capturing the understanding of learning materials and enhance the quality of teaching and learning. Arsyad (2011) states that the main function of learning media is as a teaching aid that also influences the learning ambience, conditions, and learning environment that is organized and created by the teacher. Table 6 shows students outcome in cycle II and Figure 5 shows the improvement when we compare it with previous cycle.

Table 6 Daily Test Score during Cycle II

No	Score Criteria	Daily Test Score	Number of Students	Score Range	Number of Students
1	Lowest Score	80	12	50 - 74	0
2	Highest Score	97	1	75 - 80	12
3	Average Score	87	5	81 - 100	20
4	Mean	.094			
	Range of Values	17	% Completeness		32
			100		

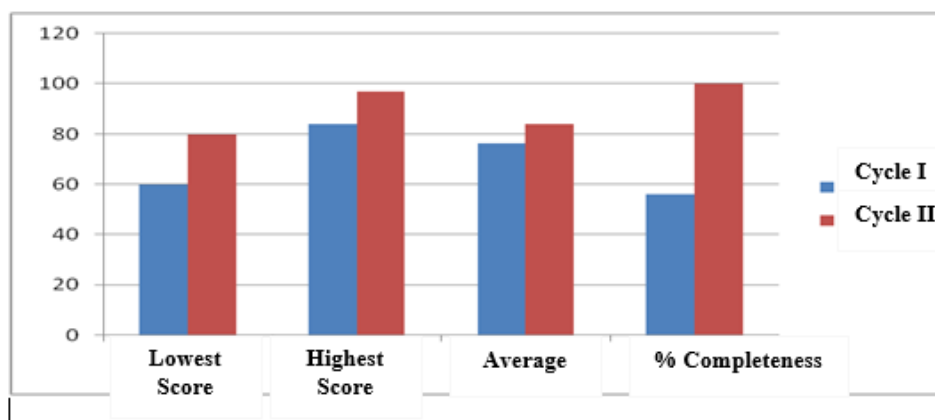


Figure 5 Comparison of Students' Scores between Cycle I and Cycle II

Skeletal System of Each Organ Using RANGKAPANTAS is also in accordance with the principles of using teaching aids. As the learning methods and techniques applied in Cycle II were also the same as teaching and learning process in Cycle I, namely discussion method and presentation technique, students seemed to be more excited, more interested, happy, and cheerful (Sukamadinata, 2007). Cooperation between students within groups and in class looked better than the teaching and learning process in Cycle I.

Discussion in each group as well as questions and answers session in class during group presentation was more lively; students were more serious in carrying out their tasks, in preparing presentations and doing practice questions. Then students submitted work to the teacher before a specified deadline.

Pintrich and Schunk in Febriyanti (2018) say that interest is a motivation which influences attention, learning, thinking, and achievement. Learning interest is a part of motivation so that it affects mental (attention, thinking) and physical (learning and achievement) behavior in humans. Usman in Ryan & Zulfah (2021) mentions that the state of effective teaching and learning is when students give interest and attention during learning process. Interest has a great influence on learning, as someone will do things he/she is interested in and will be motivated to achieve it.

The teaching and learning process in Cycle II, which was more lively and more dynamic, seemed to have increased in activity when compared to the teaching and learning process during Precycle and Cycle I, indicating the high students' interest in Biology, especially on the concept of Movement System and sub-concept of Skeletal System. Students expressed interests in the material, because it was not only theoretical, but knowing the types and functions of bones in the human skeleton in a concrete way. Students' activities in learning Biology increased by 15.88%, activities in teaching and learning process in Cycle I was 74.59% increased to 86.44% in Cycle II. While the comparison of activities between Precycle and Cycle II showed a significant increase of 26.47%, from 68.44% in Precycle became 86.44% in Cycle II. It showed that students' interest in Biology had increased. Average Percentage of interests and activities in Precycle, Cycle I and Cycle II is presented in Figure 7.

The achievement level of students' scores observed in the teaching and learning process on the concept of Movement System and sub-concept of Skeletal System with minimum completeness criteria of 75, when compared to Cycle I, there was a significant increase, because the percentage of students who scored 75 or more was 100%. In comparative descriptive: The lowest score increased 33.3%, from 60 to 80. The highest score increased 20.23 % from 84 to 97 and the average score increased by 21.25% from 70 to 87 as depicted in Figure 6.

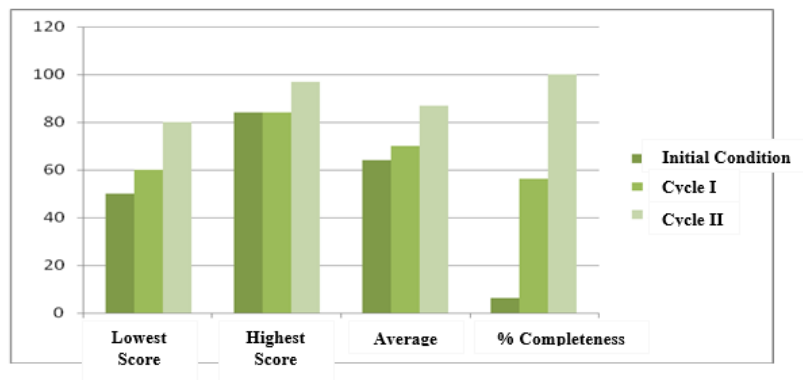


Figure 6 Comparison of Students' Scores during Precycle, Cycle I and Cycle II

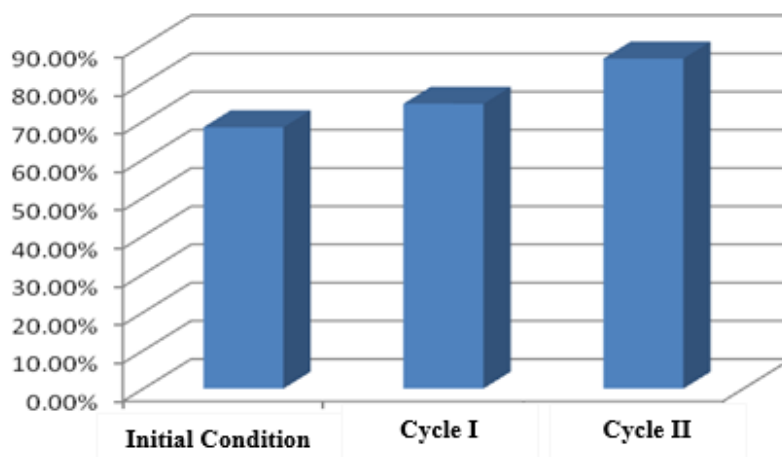


Figure 7 Average Percentage of Interests and Activities of Precycle, Cycle I and Cycle II in Bar Graph

The researcher believe that "RANGKAPANTAS" teaching aid in the teaching and learning process particularly on the concept of Movement System and sub-concept of Skeletal System can help to explain the materials to students. Its integral use with the objectives and content of learning accelerates the teaching and learning process and helps students in understanding the lesson given by the teacher (Sanaky, 2013). It creates higher quality learning, more meaningful explanation of material for students because the students can capture materials in both audio and visual.

Learning interest is the attention, liking, interest of a student towards learning activities shown through enthusiasm, participation, active learning, realizing the importance of activities and having a big role, then learning will be more effective and efficient. Furthermore, changes occur in students in the form of skills, attitudes, habits, knowledge, skills, and learning experiences (Arfani & Alimah, 2015).

Therefore, teachers must be able to foster students' interest in learning before learning begins so that learning process can be more effective and efficient. In accordance with Masitoh (2011), there will be a process of activities carried out by individuals in learning when learning involves physical, mental and emotional. So, the researcher believes that when a student majoring social science learns about Skeletal System, physically, the student will see, observe and hold the "RANGKAPANTAS" model, and mentally, the student will think and feel various types of feelings such as comprehension and curiosity.

CONCLUSION

Learning using "RANGKAPANTAS" teaching aid with the application of the discussion learning method on the concept of Movement System and sub-concept of Skeletal System has been proven to increase students' interest which can be measured by the results of questionnaires on students' activities and learning outcomes for students of XI IPS 2 class semester 2 in the academic year 2021/2022 for the concept material of Movement System and sub-concept of Skeletal System.

Learning using "RANGKAPANTAS" teaching aid with the application of the discussion method on the concept of Movement System and sub-concept of Skeletal System effectively increased students' interest in XI IPS 2 class semester 2 in the academic year 2021/2022. All students enthusiastically made presentations with "RANGKAPANTAS" to find out the human skeleton as a whole. The teacher provided guidance and direction when students observed "RANGKAPANTAS", looked for learning resources, presented and worked on questions. There was an increase in students' interest in learning in the sub-concept of Skeletal System through the "RANGKAPANTAS" teaching aid.

Those findings suggest that: (a) It is better to study the concept of Movement System and sub-concept of Skeletal System using "RANGKAPANTAS" teaching aid. (b) In conducting teaching and learning process, all students were interested in the concept of Movement, they felt interested, happy, serious, and active to ask some questions to their friends and teacher. (c) Schools should facilitate to create and use of the

"RANGKAPANTAS" teaching aid.

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