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IMPLEMENTATION OF COOPERATIVE LEARNING MODEL TYPE OF TPS BASED SAVI TO COMPLETE STUDENT LEARNING OUTCOME OF X-GRADE STUDENTS ON THE MATERIAL OF ELECTROLYTE AND NONELECTROLYTE SOLUTION IN SMAN 1 SIDOARJO

Yovi Ocktaviani, Muchlis*, and Bertha Yonata
Chemistry Department FMIPA Universitas Negeri Surabaya
email: muchlis@unesa.ac.id Mobile phone: 081330081333

Abstract

The aims of this research were to determine the learning implementation, student activity, and student learning outcome mastery after the implementation of cooperative learning model type of TPS based SAVI on the material of electrolyte and nonelectrolyte solution. The type of this research was pre-experiment research with the research design that has been used was "one group pretest-posttest design". The subjects of this research were students of X-IPA 1 SMAN 1 Sidoarjo academic year of 2017-2018 which amounted to 36 students. The results of this research indicated that there was a very good collaboration between cooperative learning type of TPS with SAVI approach. The implementation of cooperative learning model type of TPS based SAVI got average quality on the first meeting of 3.14 (very good) and the second meeting of 3.73 (very good). Students had activity time percentage of TPS and SAVI were dominant. The learning outcomes of all students on electrolyte and nonelectrolyte solution reached the individual mastery of 94.4% in the first meeting, while in the second meeting reached the individual mastery of 97.2%. This means the students of X-IPA 1 have achieved classical mastery. The conclusion of this research was cooperative learning type of TPS based SAVI can complete student learning outcome on electrolyte and nonelectrolyte solution.

Keywords: cooperative, TPS, SAVI, learning outcome.

INTRODUCTION

Education is a conscious and planned effort to create learning atmosphere and learning process so that learners actively develop their potential to have spiritual power, self-control, personality, intelligence, noble character, and the skills needed by himself, society, nation and state [1]. The definition above gives an explanation that education is the process of forming one's intelligence and skills that can be useful for himself, society, nation and state. It means that the future of the nation and state is determined by how extent the education of Indonesia to be able to form the intelligence and skills so that it can build its country in order to develop.

Education is manifested through the learning process. Permendikbud number 69 of 2013 on the basic framework and curriculum structure of SMA / MA states that teacher-centered learning pattern becomes learning that is centered on learners; passive learning pattern becomes active-finding learning; and the individual learning pattern becomes group learning (team-based) [2]. Meanwhile, the current learning situation of students tended to depend on the teacher in learning the material so that students could not independently summarize the material.

The statement is based on the results of pre-research questionnaire on November 2nd 2017 in SMAN 1 Sidoarjo that from 45 students of X and XI class, 55% of students stated the way of learning chemistry was often done in the classroom by listening to explanations from teacher. Students accepted only what teachers said and did not develop and seek ideas related to the topic presented, whereas the desired learning situation should pay more attention to students activeness in building their own knowledge. Students who did not actively build their own knowledge then the student would often forget and could not understand the material well. This would impact on the mastery of student learning outcome.

One of the most commonly chosen solutions to optimize activeness and complete student learning outcome is by implementing a cooperative model type of Think-Pair-Share (TPS).

Think-Pair-Share is a type of cooperative learning designed to influence the interaction patterns of students and give students time to think, respond and help each other with one another [3]. The number of group members consisting of only 2 people (pairs) can optimize the active role of each student. Think-Pair-Share (TPS) is a way to improve the ability of learners in remembering the information (thinking) and also can learn from other students and give their ideas to be discussed (pairing) and also can improve self-efficacy in delivering the results of discussion in front of the class (sharing)[4].

Several studies on the implementation of cooperative learning model type of TPS has been proven to be able to complete the student's learning outcomes on chemistry subject. The research conducted by Sari and Muchlis stated that the classical mastery of Think-Pair-Share cooperative learning implementation result from 1st, 2nd and 3rd meeting were 75%, 85%, and 90% [5]. These results indicate that the class has been mastered classicaly, but the study did not accommodate any learning styles possessed by students. Meanwhile, the results of the pre-research questionnaire on November 2nd 2017 in SMAN 1 Sidoarjo stated that in a class of 25 students, 20% of students had somatic learning style, 16% of students had auditory learning style, 40% of students had visual learning style, and 24% of students had intellectual learning style.

One of the criteria of effective learning is able to serve students learning style and students learning speed that are different, so that the learning process can achieve the goals in accordance with the program specified [6]. Based on the statement, it can be concluded that the implementation of TPS method only was not enough to optimize the student's ability. Therefore it was needed a learning approach that can understand and accommodate various learning styles owned by students that was SAVI approach.

SAVI approach is a learning approach that emphasizes the learning process must utilize all the sensory devices that students have. The term SAVI is short for somatic meaning that learning by moving and doing; auditory meaning that learning must be listening; visual meaningful learning should use the eye's senses; intellectual meaning that learning by solving problems [7]. Accommodating these four elements can resolve the diversity of students learning style in a class. Through the SAVI approach students with the diversity of learning styles can be more focused and maximized in understanding the material presented by the teacher.

METHOD

This research was a quantitative research with type of research was pre-experiment research by using the subject of a class without a comparison class. This research tried to examine the existence of relationship between learning process to student learning outcomes on electrolyte and nonelectrolyte solutions material with cooperative learning model type of TPS based SAVI, and it has been conducted at SMAN 1 Sidoarjo in X-IPA 1 class in the even semester on January 15-24th 2018.

The design of this research was One Group Pretest-Posttest Design. First, the research subject was identified the initial conditions by carrying out pretest (preliminary test). Then the research subject has performed an activity (treatment). At the end of the activity the condition is measured by posttest (final test). The posttest score was compared with the minimum mastery criteria of chemistry subject on the electrolyte and nonelectrolyte solution material to determine the mastery of learning outcome.

Minimum mastery criteria of chemistry subject at SMAN 1 Sidoarjo was 75. Students were said to complete individual mastery if the value of posttest was greater than or equal to 75, while for the classical mastery if there were at least 75% of students in the class which reached the individual mastery.

RESULTS AND DISCUSSIONS

The Implementation of Cooperative Learning Model type of TPS

The data of the implementation of cooperative learning model type of TPS was the result data of the observation on the ability of the teacher to manage the learning based on cooperative learning type of TPS syntax and lesson plan expressed by the quality of the implementation. The syntax of cooperative learning model type of TPS consists of 6 phases which was described as follows.

Phase 1 was an activity to open the learning process and deliver the learning objectives. Next the teacher performed aperseption and motivation. Phase 2 was an activity of material presentation in general about the material of electrolyte and nonelectrolyte solution. New knowledge and skills can not be learned until a foundation of related knowledge has been understood [8].

Phase 3 was an activity explaining how to learn to be done and the division of the group. All 36 students were divided into 18 groups of 2 students per group (pairs). Phase 4 was an activity to guide students in working on worksheet. Students were guided to collect data through SAVI activities based on instruction in the worksheet. First the students did experiment (somatic) then analyzed the results of the experiment (intellectual) and finally watched the video (auditory-visual). Then students were asked to think and did worksheet individually (thinking). After that the students were allowed to discuss and match the correct answers with their partner (pairing).

Phase 5 was an activity to share and communicate the results of discussion with the partner in front of the class. Reflecting learning objectives can only be achieved by using a group delivery strategy to create reports and communicate the results [9]. Phase 6 was a reward-winning activity. Before giving rewards, teachers first guided students to sum up the overall learning outcomes. Next, teacher appointed the class leader to lead the prayer together, then said the closing greeting.

Based on the above description, the quality of implementation of cooperative learning model type of TPS based SAVI can be observed in Table 1.

Table 1 The implementation of cooperative learning model type of TPS based SAVI

Activity	Phase of *TPS* cooperative learning	Implementation quality	
		1st meeting	2nd meeting
Introduction	*Phase 1*	3 (very good)	3.71 (very good)
Main Activity	*Phase 2*	3 (very good)	3.62 (very good)
	Phase 3	3.37 (very good)	4 (very good)
	Phase 4	2.86 (good)	3.57 (very good)
	Phase 5	3.3 (very good)	3.6 (very good)
Closure	*Phase 6 :*	3.31 (very good)	3.9 (very good)
Average of overall learning process		3.4 (very good)	3.73 (very good)

The average quality of all learning practices had value of 3.14 in the first meeting and 3.73 in the second meeting in the very good category. This indicates that the teacher has implemented a good learning management and appropriate with syntax of cooperative learning model type of TPS based SAVI on the material of electrolyte and nonelectrolyte solution.

Student Activities

Student activity data was the result of observation to activity done by student during cooperative learning process type of TPS based SAVI which was expressed with percentage of activity time (%). Observations were made per group by 5 people according to the instructions provided. The descriptive discussion of student activities was described as follows.

The first activity was listening to teacher's explanation. This activity needed to be done so that students were able to understand the material that was taught. At the first and second meeting, time percentage of "listening to teacher's explanation" activity was 6.87%. The second activity was to express the opinion. Students should be actively involved in the learning process, so that teacher provided opportunities for students to convey their ideas and not give ideas and theories directly [8]. At the first meeting, the time percentage of "express the opinion" activity was 2.02%, while in the second meeting was 3.22%.

The third activity was doing experiment (somatic). Experiment motivated students in learning because by doing experiment students knew directly the application of the concept of the material that was studied. Somatic activity data can be observed in Table 2.

Table 2 Recapitulation of average data of student somatic activity

Learning style	Average of somatic activity time (%)	
	1st meeting	2nd meeting
somatic	20.13	16.08
auditory	18.03	15.06
visual	19.3	16.43
intellectual	16.12	14.17

Table 2 shows that in the first or second meeting students with somatic learning styles spent more time to do experiment activities (somatic) than the students with other learning styles. It was evident that students with somatic learning styles prefer to learn (understanding new knowledge) by performing physical activities such as experiments or demonstrations. Meanwhile, classically, the time percentage of "do experiment "activity was 19.59% at the first meeting, while at the second meeting was 16.23%.

The fourth activity was to analyze the results of the experiment (intellectual). This analysis activity trained student's skills in critical thinking. The intellectual activity data can be observed in Table 3.

Table 3 Recapitulation of average data of students intellectual activity

Learning style	Average of intellectual activity time (%)	
	1st meeting	2nd meeting
somatic	10.22	9.07
auditory	10.9	9.79
visual	11.62	10.75
intellectual	12.52	11.54

Table 3 shows that in the first or second meeting students with intellectual learning style spent more time to perform analyze activities (intellectual) than the students with other learning styles. It was evident that students with intellectual learning styles prefer to learn (understanding new knowledge) by thinking deeply such as analyzing or solving problems. Meanwhile, classically, the time percentage of "analyze the result of experiment" activity was 12.86% at the first meeting, while at the second meeting was 11.26%.

The fifth activity was listening and watching the video (auditory-visual). Students observed (visual) video and then discussed (auditory) the results of the video with a partner, so the process of understanding the material becomes easier. Auditory and visual activity data can be observed in Table 4.

Table 4 Recapitulation of average data of auditory and visual activities of students

Learning style	Average of intellectual activity time (%)	
	1st meeting	2nd meeting
somatic	11.4	9.92
auditory	10.13	10.13
visual	11.62	10.75
intellectual	10.85	10.85

Table 4 shows that at the first or second meeting all students spent almost the same time to do the activity of listening and watching the video, because students were very enthusiastic and curious when teacher was playing videos. So almost all students paid attention to the video from start to finish. Although the time of students with auditory and visual learning styles were not dominant from students with other learning styles but these still showed that students with auditory learning style liked to learn (understanding new knowledge) by listening and discussing things that will be learned, while students with visual learning style like to learn by observing things will be learned. Meanwhile, classically, the time percentage of "listening and watching the video" activity was 10.09% at the first meeting, while at the second meeting was 10.38%.

The sixth activity was doing worksheet individually (thinking). The best learning is able to make students understand and learn to solve the problems, do the tasks given, and learn the new material [10]. At the first meeting, the time percentage of "doing worksheet individually" activity was 15.93%, while in the second meeting was 13.30%. The seventh activity was to discuss about the worksheet together with the partner (pairing). In line with the Vygotsky theory that if students interact with people who know better the teacher or his friends will cause the student's ability to increase above the actual ability [8]. At the first meeting, the time percentage of "discuss about the worksheet with the partner" activity was 11.26%, while at the second meeting was 10.38%.

The eighth activity was presenting the results of doing worksheet (sharing). In the sharing activity was expected to occur a question and answer that encourages the construction of integrative knowledge, and students could find the structure of knowledge learned [11]. At the first meeting, the time percentage of "presenting the results of doing the worksheet" activity was 11.84%, while at the second meeting amounted to 18.71%. The ninth activity was to conclude the learning. At the first meeting, the time percentage of "conclude the learning" activity was 8.63%, while at the second meeting was 8.92%. The tenth activity was irrelevant activity. At the first meeting or second meeting there was an irrelevant activity that some students did, that was playing a cell phone. At the first meeting, the time percentage of irrelevant activity was 0.88%, while at the second meeting was 0.73%.

Based on the above data, the results of the student activity data can be observed in Figure 1.

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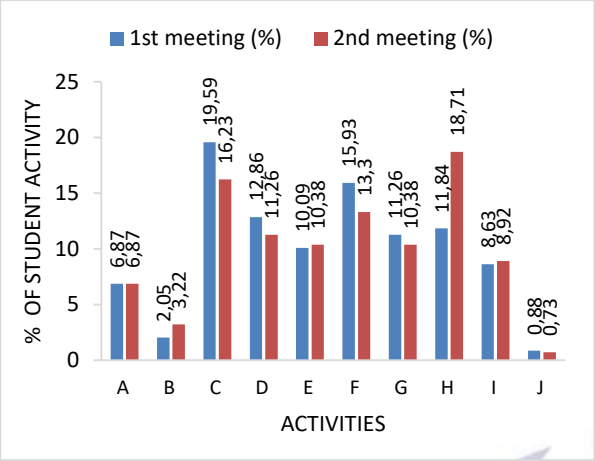

Figure 1 Diagram of the student activities

Information :
A = Listen to teacher's explanation
B = Express the opinion
C = Do experiment (somatic)
D = Analyze data of experiment result (intellectual)
E = Listen and watch the video (auditory and visual)
F = Do the worksheet problem individually (thinking)
G = Discuss about doing worksheet with the partner (pairing)
H = Present the results of doing worksheet (sharing)
I = Conclude the learning
J = Irrelevant activity

Based on Figure 1 it can be observed that the average percentage of relevant activity time that were TPS and SAVI activities (Activity C, D, E, F, G, H) were greater than other activities (Activity A, B, I, J). This indicates that the students had activities well and in accordance with cooperative learning steps type of TPS based SAVI on the material of electrolyte and nonelectrolyte solution conducted by the teacher.

Student Learning Outcome

Cognitive learning outcome was the student learning outcome in the knowledge realm of electrolyte and nonelectrolyte solution material. The cognitive learning outcome was obtained by posttest after the cooperative learning type of TPS based SAVI. Cognitive learning outcome was analyzed to determine the mastery of student learning outcome. The result of posttest value was compared with minimum mastery criteria of chemistry subject at SMAN 1 Sidoarjo was 75. Students were said to complete individual mastery if the value of posttest was greater than or equal to 75, while for the classical mastery if there were at least 75% of students in the class which reached the individual mastery.

At the first meeting there were 2 somatic students whose learning outcome were incomplete. Both students had lower somatic activity time than other somatic students. This was because there was factor that cause some students less to optimize the activeness in do experiment that was the limitation of electrolyte test equipment. When do experiment, electrolyte testing equipments that could be used there were only 5 sets, so a set of equipment has been used by 6-8 students. The number of students was too much and caused some students have been less active in experiment activities. Some students were less able to absorb knowledge according to their learning style, so as the good learning outcome could not be obtained.

At the second meeting there was 1 intellectual student whose learning outcome was incomplete. The student had enough time for intellectual activity. This was because the format of analysis activities on the worksheet was too general and less detailed, so some students, especially those with intellectual learning styles, were less able to relate the results of the analysis to the knowledge they need to absorb. Students paid less attention to the results of their analysis. Teachers should give more time in analysis activities and direct the analysis activities so that more information was explored and students can more easily understand the material according to their learning style.

Meanwhile, all students with auditory and visual learning styles were completed individual mastery in the first or second meeting. This indicated that there was a match in auditory and visual activities. Students became easier to absorb information through the mixing of text, image and sound (video). This was consistent with the dual coding theory that information tends to be more easily learned by integrating verbal information (text and sound) and visual information (images) [12]. Students were more easily understand the material and learning outcome that was obtained also better.

The number of students who completed the learning outcome at the first meeting as many as 34 and who did not complete the learning outcome as many as 2 students. Meanwhile, the number of students who completed the learning outcome the second meeting as many as 35 students and the number of students who did not complete the learning outcome as many as 1 student. The data results of students learning outcomes at the first

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and second meeting can be observed in Figure 2 and Figure 3.

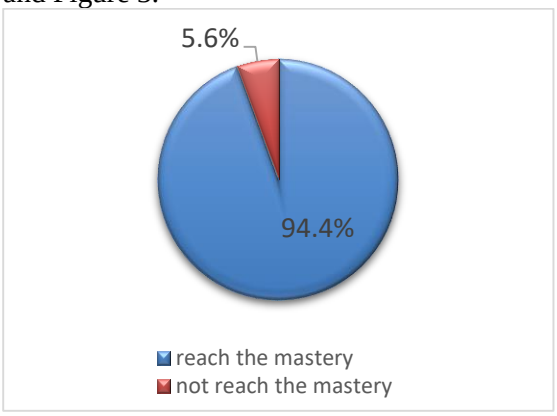

Figure 2 Diagram of student learning outcomes mastery at the first meeting

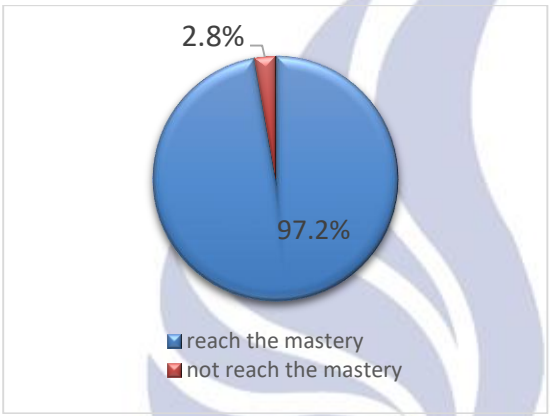

Figure 3 Diagram of student learning outcomes mastery at the second meeting

Based on Figure 2 and Figure 3 it can be observed that the classical mastery of X-IPA 1 was 94.4% at the first meeting and 97.2% at the second meeting. Classical mastery at first or second meeting was greater than 75% so it can be said that X-IPA 1 class has completed classical mastery. These results indicated that cooperative learning type of TPS based SAVI approach could complete student learning outcome on the material of electrolyte and nonelectrolyte solution.

When students learned individually (thinking) through SAVI approach, students could be more comfortable learning through facilitation learning style of students by working on worksheet SAVI. If students were comfortable in learning then the students more easily understand the teaching materials and also easy to achieve learning outcomes mastery. Gardner explained that children also learn well and understand what was learned if it was related with what is already known and the method of learning facilitated all their learning styles (learning styles of listening, seeing, and moving or doing) and the various intelligences that they had [7].

When students worked with others, students could help and have been helped to understand the learning materials. Students could exchange their opinions with their group and got good learning outcome. Cooperative learning model type of Think-Pair-Share provided an opportunity for students to be actively involved during the learning activities, thus helping to improve student learning outcomes [13]. In the TPS type cooperative learning students were directed and motivated to help each other so that students could achieve good learning outcomes together.

CLOSURE

Conclusion

Based on the formulation of problems and the results of discussion above, it can be concluded that:

1. The implementation of cooperative learning model type of TPS based SAVI on electrolyte and nonelectrolyte solution material overall for the first and second meetings got greater than 2.1, with the average quality of the first meeting of 3.14 (very good) and the second meeting of 3.73 (very good). This indicated that the learning and teaching processes of the electrolyte and nonelectrolyte material have been managed well.
2. Relevant student activities that were activity of TPS and SAVI got percentage of activity time greater than other activities, so it could be said that activity of TPS and SAVI were dominant activities during learning process. This indicated that the students have been active and study the material of electrolyte and nonelectrolyte solution well.
3. Student learning outcome on electrolyte and nonelectrolyte material have achieved classical mastery of 94.4% at the first meeting and 97.2% at the second meeting. Both values were greater than 75%. This showed that cooperative learning type of TPS based SAVI could complete student learning outcome on the material of electrolyte and nonelectrolyte solution.

Suggestion

Based on the research that has been done and the results that have been obtained, the researcher gives some constructive suggestions as follows:

1. The mechanism of implementation of SAVI approach should be appropriated to the students learning style. If the learning style of the students is really dominant in one particular learning style then the SAVI learning mechanism can be done separately according to the learning style, but if the students do not have dominant learning style (tend to have the four learning styles) then SAVI learning mechanism is just put together.
2. The implementation of cooperative learning model type of TPS with SAVI approach requires a lot of time in its practice, so it should be considered the use of time allocation and good class management. Teachers must be good in directing student activities so that time is not wasted or consumed for other activities.
3. In this research, required questionnaires or interviews of students as supporting data to ensure that the longer time that is used by student do certain activities so the student increasingly enjoy (like) the activity as a way for students to learn (study).

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