Developing and Implementing the Sharing and Jumping Tasks Learning Designs on the Topic of Electrolyte and Non-electrolyte Solutions with Environmental Literacy to Foster Students' Collaborative Skills

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Abstract

The research, entitled Developing and Implementing the Sharing and Jumping Tasks Learning Designs on the Topic of Electrolyte and Non-electrolyte Solutions with Environmental Literacy to Grow Students' Collaborative Skills", aimed to develop sharing and jumping task learning designs and foster students' collaborative skills during learning through the implementation of the learning design. The needs of 21st-century learning, one of which is that students develop collaborative skills, motivated this research. According to field research, learning in schools has been concentrated on students but has not been successfully implemented, has not improved collaborative skills, and the material has not yet been supplied with environmental literacy. The qualitative method was applied in this study. The assessment sheets for the concept of electrolyte and nonelectrolyte solutions in textbooks and ebooks, interview guidelines, lesson plans utilized by teachers, and learning design validation sheets were used as instruments. The learning design yields results consisting of student situations/issues/problems, predictions of student responses, and anticipation/teacher assistance organized in three parts, namely introduction, core activity, and closing. The profile of collaborative skills that grow in the implementation of sharing tasks is indicators 1 and 2 with 100% each, and the jumping task is indicator 2 with 82.35%.

Keywords: Collaborative skills · Sharing and jumping task · Electrolyte and nonelectrolyte solutions

INTRODUCTION

The twenty-first century is known asthe "knowledge age." Teachers now play an essential part in learning practice as they must be able to developa learning system that is appropriate forthe twenty-first century in the teaching and learning process. Learning in the twenty-first century incorporates knowledge, skills, and mastery of technology and information. One of the themes of the twenty-first century is environmental literacy.

Environmental literacy encompasses the ability to be responsible and to provide purpose to one's life by caring for and utilizing the environment (Baroya, 2018). Environmental literacy skills of students are an important item that teachers should pay attention to since it may raise students' awareness and concern for environmental concerns and educate students to designsolutions to solve environmental challenges that arise in life (Ramadhana, 2021). Environmental concerns are one of the topics covered in Education for Sustainable Development (ESD). According to the findings of a study undertaken by Abuhola, Cunningngham, and Sontay et al (in Ramadhana, 2021) students have inadequate environmental literacy,with numerous variables contributing tothis, including a lack of intention to learn about and study environmental issue.

According to the National Education Association (n.d.), 21st- century skills are known as "The 4Cs," which comprise critical thinking, creativity, communication, and cooperation (Redhana, 2019). As stated by Reed (in Verawati et al., 2020) collaboration skills include the capacityto work together, involve the ability to relate to other people in which they may understand differences, and solve

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problems by gathering information from each other. Vygotsky's idea of social constructivism serves as the foundation for collaborative learning. According to Binkley et al. and Greenstein L (in Verawati et al., 2020) there are some indicators of collaborative skills, including the ability to speak and express one's opinions, value and appreciate the opinions of others, solve problems through teamwork, divide tasks among group members effectively, show concern for friends, and be able to mentor others to achieve goals. It is anticipated that learning would be student-centered through collaborative learning.

One of the chemical topics covered in high school is an electrolyte and non-electrolyte solutions (SMA). This content combines mathematical procedures, chemical phenomena, abstract notions, and practical exercises(Rahmadani, 2017). According to the findings of Safitri et al., (2019) research, the teacher is still at the centerof learning chemistry, and the learning style employed is the lecture approach, with occasional discussions,demonstrations, and practice problems. Meanwhile, field studies show that learning of electrolyte and nonelectrolyte solution materials is student-centered, but implementation is not optimal, as students struggle to understand the material being taught, are unable to improve collaborative skills, and the material is not yetcharged with environmental literacy.

Group learning models and cooperativelearning are examples of learning models that can help students develop collaborative skills. The STAD (Student Team Achievement Divisions)cooperative learning paradigm is one ofthe cooperative learning models. Students that are actively engaged in learning have various levels of comprehension. As a result, a learning method that can fit this condition must be designed. Learning based on sharingand jumping tasks is one of the learningdidactic designs that may be applied. Learners with varying levels can work together to improve their skills (Fatimah et al., 2018). All students, including those with strong cognitiveskills and those with poor cognitive skills, can benefit from learning sharingand jumping tasks (Amzar et al., 2018).

Based on the preceding description, the researcher created and implemented sharing and jumping task learning designs on the topic of electrolyte and nonelectrolyte solutions charged with environmental literacy to improve students' collaborative skills.

METHODS

This research employed a qualitative approach with a Didactical Design Research (DDR) design. According to Suryadi (2013), didactic design research has three stages: (1) didactic situation analysis before learning, (2) didactic situation analysis during learning, and (3) didacticsituation analysis after learning.Transcript-based Lesson Analysis was used to process the collected data (TBLA).

The research was carried out in one of Cimahi City's high schools. Thisresearch had 34 students asparticipants. The electrolyte andnonelectrolyte solution concept evaluation sheets, teacher and student interview guidelines, lesson plan assessment sheets, and learning design validation sheets were employed in this study.

RESULTS AND DISCUSSION

The sharing and jumping task learning design was created in responseto students' learning challenges in electrolyte and nonelectrolyte solutions. Students learning challenges were evaluated based on the analysis of concept assessments connected to electrolyte and nonelectrolyte solution materials from various sources, the results of interviews with students and teachers, and the study of lesson plans regularly used by teachers. The researcher created a learning design after recognizing the students' learning challenges.

The essential concepts include electrolyte and nonelectrolyte solutions, according to the examination of concept evaluation, lesson plans, and interviews. The researcher's learning approach includes environmental literacy to raise students' understandingof environmental protection.

The learning design is made up oflearning syntax depending on the model employed (STAD model), sharing and jumping tasks, situations, difficulties, or challenges, anticipating student responses, and anticipation or teacher assistance (researcher). Before implementation, the learning design was validated by two chemistry education expert lectureres and a chemistry teacher. The advice provided by the validator became a consideration for researcher to enhance sharing activities and jumping tasks on electrolyte and nonelectrolyte solutions.

The learning design includes an introduction, core activity, and closing. In the first section, students observed and discussed the fishing footage with a stun device. They also watched demonstrations of the concept of electricity moving in solution. Four sharing tasks, jumping tasks, and quizzes make up the basic activities. In sharing task 1, students conducted anelectrical conductivity test experiment on the materials presented by each group. In sharing task 2, students identified the materials that had been evaluated, including strong electrolyte solutions, weak electrolytes, or nonellectrolytes. Meanwhile, in sharing task 3, students performed an electrical conductivity test experiment on the same substance but in a different form, and the students presented the results of the experiment. Students formulated and delivered conclusions in sharing task 4. Students checked and calculated quiz results as the closing activity. The assembled learning design includes the learning syntax of the model employed (the STAD model), situations/issues/problems, predictions of student responses, anticipation/teacher assistance, and learning time allocation.

Following the completion of the implementation, a redesign of the sharing and jumping task was designed. Based on the observations during implementation, the learning design was improved. The preliminary demonstration, deleting the revised learning design so that students can directly try out the electrical conductivity experiment for themselves and so that demonstration time can be allocated for other activities, adding pictures of experimental tool sets in sharing tasks 1 to provide an overview to students about the experiments carried out, and improving the question sentences were some improvements to the learning design. The number of characters uttered to students or teachers was analyzed. The graph below shows the number of characters spoken by theteacher/student in group two.

Figure 1. The number of characters spoken by the teacher/student group 2

The graph above shows the number of characters in theconversation between teacher and students in Group 2. The graph above shows the number of teachers speaking,whereas the graph below shows the number of students speaking. The total number of dialogues uttered by students was 646, whereas the total number of dialogues said by the teachers 159.

The teacher was more dominating in speaking to provide questions at the apperception and demonstration stages at the beginning of learning, namely conversation index 1 to 126 conversation index. Students with conversation indexes 127 to 555 are more dominating in speaking; in the conversation index, students discuss sharing tasks 1 to 4. In this index, student representatives express the outcomes of practicum and discussions, although students frequently respond toqueries from researcher with brief answers, resulting in a short graph ofthe students' talks. The conversation indexes of 556 to 581 are relatively balanced in speaking between the teacher and students, with student representatives conveying learningconclusions and answering questions posed by researcher.

The conversation indexes of 582 tothe conversation indexes of 772 students actively discussed solving the challenges on the given jumping task and representatives of students conveyed the results of their discussions to the researcher. Furthermore, on the index, students complete tests based on the LKPD.

In the closing activity, which consists of a score and award calculation phase, namely the conversation indexes of 773 to the conversation indexes of 805, it appears that the teacher and students are quite balanced in speaking, even though the graph of the students' conversations is short because

when discussing quizzes, the researcher reads more questions andparticipants students answer with short answers.

Based on the analysis of graphicobservations, the average learningsharing and jumping task on the topicof electrolyte and nonelectrolytesolutions charged with environmental literacy had more conversations uttered by students than conversations spoken by the teacher. where there is a shift from what was initially teacher- centered learning to what is now learner-centered learning. When students work on sharing tasks contained in the fundamental activities, student-centered learning begins to emerge.

In terms of the graph, the students' interactions are quick because they answer questions briefly, and the researcher's questions have succinctresponses. While the researcher's speech graph was relatively high at the start of the course because theresearcher delivered directionsregarding the activities assigned to students.

Each indicator, as well as theimplementation of sharing and jumpingtasks, is used to evaluate the collaborative skill profile. In each group, each indicator of collaborativeskills is recognized. The following is a profile of collaborative skills in termsof task-sharing implementation.

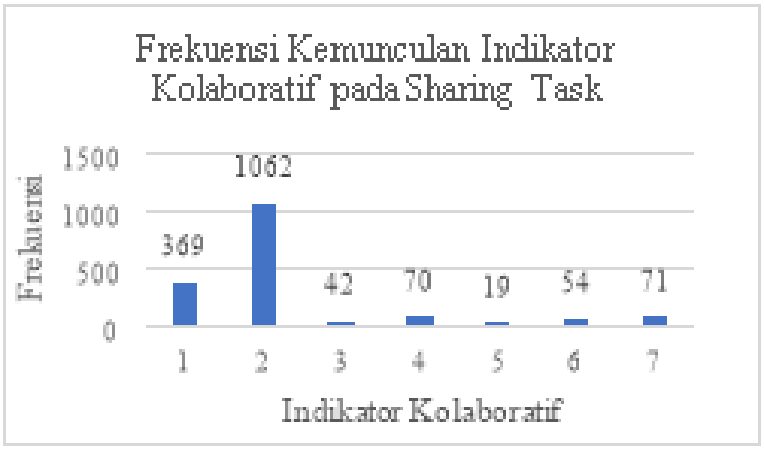

Figure 2. Frequency of CollaborativeIndicators Appearing on Sharing Tasks

Collaborative Indicator Description:
Indicator 1: ask a friend or teacher when something is not understood
Indicator 2: speaking and opinion
Indicator 3: respect and appreciate theopinions of others
Indicator 4: work together to solve aproblem
Indicator 5: sharing tasks with members of one group well
Indicator 6: care for friends
Indicator 7: able to guide others toachieve common goals

Seven collaboration indicators may occur when sharing task activities. The most common collaboration indicator in sharing tasks is indicator two, which is the indicator of speaking and opinion, while the least common collaborative indicator is indicator five,which is the indicator of sharing tasks with members of one group. Based on the frequency of occurrence of collaborative indicators, it can be stated that students who complete sharing activities engage in more discussions inwhich they can freely express their opinions. The following is a profile of collaboration skills in terms of jumpingtask implementation.

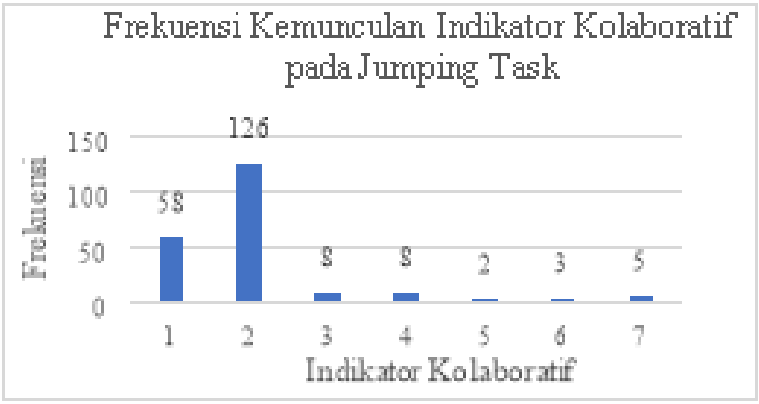

Figure 3. Frequency of CollaborativeIndicators Appearing on Jumping Task

Collaborative Indicator Description:
Indicator 1: ask a friend or teacher when something is not understood
Indicator 2: speaking and opinion
Indicator 3: respect and appreciate theopinions of others
Indicator 4: work together to solve aproblem
Indicator 5: sharing tasks with members of one group well
Indicator 6: care for friends
Indicator 7: able to guide others toachieve common goals

Seven collaboration signs may arise in the jumping task. The most common collaboration indicator in the jumping task is indicator two, which is the indicator of speaking and opinion, while the least common collaborative indicator is indicator five, which is the indicator of sharing tasks among members of one group. Based on the frequency of occurrence of collaborative indicators, it is possible toconclude that students who complete the jumping assignment engage in morediscussions in which they can express their opinions freely. The analysis ofcollaboration skills on sharing activitiesand jumping tasks is quite good, and it is also demonstrated that it is quite following the predictions of student replies contained in the learning design based on the learning profile of students through LKPD answers.

An examination of the student's collaborative abilities profile was achieved by learning the didactic design of sharing and jumping activities for electrolyte and nonelectrolyte solutions with environmental literacy. The percentage of indicators of collaborative skills that improve throughout task-sharing activities is shown below.

Table 1. Growing Indicators on Sharing Task

Indikator	1	2	3	4	5	6	7
Jumlah Peserta Didik	34	34	20	27	15	23	22
Persentase	100%	100%	58,82%	79,41%	44,12%	67,65%	64,71%

The collaborative indicators identified in the sharing task are indicator one with 34 student respondents and indicator two with 34 student respondents. A percentage of100% is achieved from both indicators. The percentage of markers of collaborative skills that improve during the jumping task activity is shown below.

Table 2. Percentage of the Growing Indicators on Jumping Task

Indikator	1	2	3	4	5	6	7
Jumlah Peserta Didik	25	28	7	8	2	3	4
Persentase	73,53%	82,35%	20,59%	23,53%	5,88%	8,82%	11,76%

The collaborative indicator identified in the jumping task is indicator two with a total of 28 student respondents, with a percentage of 82.35%.

CONCLUSION

The development of sharing and jumping task learning designs on electrolyte and nonelectrolyte solution materials charged with environmentalliteracy to foster students' collaborative skills is arranged based on the identified learning barriers of students, according to the findings and discussions in the research that has been conducted. The stages of learning design development consist of making the first learning design, validating the first learning design, implementing the first learning design, analyzing thetranscript of the implementation results,redesigning learning sharing and jumping tasks, and validating learning redesign by experts.

An introduction in which studentswatch a video of a fisherman using an electric stunner is part of the implementation of the sharing and jumping task learning design onelectrolyte and nonelectrolyte solutions incorporating environmental literacy to enhance collaborative skills. The core activity, which consists of sharing and jumping tasks and quizzes, is the following implementation. Activities inthe closing stage of implementation include discussion about the quizzes and the reward phases. There has beena change in learning implementation from teacher-centered learning to learning that is more likely to be learner-centered.

The collaborative skill profile of students grows during the learningprocess based on seven collaborative indicators. The collaborative indicators identified in the sharing task were indicator one 369 times with 34 studentrespondents and 1062 times indicatortwo with 34 student respondents. Of thetwo indicators, it was obtained a percentage of 100%. In the jumping task, it was found that indicator two appeared 126 times with 28 student respondents with a percentage of 82.35%.

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