Identification of student’s collaborative skills in learning salt hydrolysis through sharing and jumping task design

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Abstract. The aim of this research was to identify student’s collaborative skills through implementation of the design learning based on sharing and jumping task on salt hydrolysis topic. This research was conducted at one of the schools in Bandung. The research used descriptive analysis method. The research data was obtained through recordings and observations. Analysis of research data uses Transcript Based Lesson Analysis (TBLA). Indicators of collaborative skills studied consist of asking friends / teachers when they don’t understand, able to speak or argue, appreciate and respect the opinions to others, work together to solve the problems, share tasks of fellow group members well, showing concern for friends, able to guide others to achieve goals. The results show that the seven indicators were identified during the learning process. Indicator asking friends or teachers when they don't understand was the most often identified during learning, while share tasks of fellow group members well was the lowest identified indicator.

1. Introduction
Collaborative skill is a part of the 2013 curriculum that support the 21st century’s demand. The 2013 curriculum emphasizes that students must be able to develop 21st century’s abilities that include critical thinking and solving problems, creativity, innovative, and capable in communicating and collaborating. It is very important for students to hold collaborative skills through the learning process in schools, to remain competitive in responding to the current social changes [1]. Collaborative skill is not only means cooperation, but also a skill dealing with others by respecting differences, sharing power, and gathering knowledge from others to solve a problem [2]. Through collaborative learning students can ask and answer each other questions, argue that will build interpersonal relationships between students and teacher, and can help students to develop their comprehension of the concept [3].

There are seven indicators of collaborative skills that are identified, namely: 1) asking friends / teachers when they do not understand, 2) being able to speak or argue, 3) appreciate and respect the opinions to others, 4) work together to solve the problems, 5) share the tasks of fellow members group well, 6) showing concern for friends, and 7) being able to guide others to achieve goals [4, 5]. The results of observations in one of the high schools in Bandung City shows the collaboration process has occurred but it was not optimal. This was reflected during the learning process that some students have discussed or interacted with other students but did not discuss the topic being taught but talked about something outside the learning topic. In addition, learning was still dominated by teacher explanations, only a few
students answered teacher questions with short sentences. Thus an interesting design of learning is needed to optimize collaborative skills in learning.

Sharing and jumping task design can facilitate students' collaborative skills [6]. According to Masaaki (2012), learning through sharing and jumping task design can build learning environment, exchange opinions and respect each other in differences of opinion [7]. Sharing task is a learning activities that aimed to have cooperation between groups so that each student really understands the contents of the learning topic, while jumping task is an activities of learning which level is higher and outside the textbook [8].

Salt hydrolysis is an important topic in acid-base reactions and is considered difficult by students. Students’ difficulties in understanding salt hydrolysis were caused by frequent misconceptions, including the tendency of students to use the wrong analogy [9]. Most students stated that salt is neutral because it is a neutralization reaction product [10]. Students also considered the hydrolysis process as the separation of matter into its ions [11]. This misconception can be attributed to the interpretation of the term hydrolysis [12]. Based on the description above, this study aims to identify collaborative skills by implementing sharing and jumping task design on the salt hydrolysis topic.

2. Methods
The research method used in this research was descriptive analysis. This research was conducted in one of the high schools in Bandung involving 28 students in the XI grade who were divided into 7 groups. The research used instruments include observation sheets and recorded transcripts of learning. The data obtained was analyzed using Transcript Based Lesson Analysis (TBLA), then was identified with collaborative skills indicators that appeared in each group.

3. Results and Discussion
The learning of salt hydrolysis through the sharing and jumping task design consisted of 3 activities; for the initial activity the students were asked to predict the acidity of the salt solution, for sharing activity the students were asked to do experiment to identify the acidity of salt solution and fill in the Student Worksheet, and in jumping activity the students were asked to explain the work of salt contained in toothpaste in neutralizing acidity in the mouth. The result of the identification of collaborative skill indicators during learning is shown in Figure 1 and 2.

3.1 Sharing task activities
Figure 1 shows the result of the identification of collaborative skill indicators during sharing activity. First indicator (asking to friends/teachers when students do not understand) as an collaborative skill indicators that is most identified in each group. This happened because in collaborative learning, it began with the existence of questions from students who did not understand to students who understood better [8]. During learning, questions that often arose from students in general, such as 1) How does the trial procedure ?, 2) What is the pH of the solution being tested ?, 3) How does the reaction equation occur ?, 4) Why salt solutions can have acidity that is different from other salt solutions?.

2
Collaborative skills indicators ‘asking to friends / teachers when students do not understand’ is the mostly happened in group 4. Based on observations and video recordings, those indicates that the student members of the group 4 looked very enthusiastic when learning so that they tried to ask if they did not understand, they even asked questions to other groups. This is in accordance with the results of observations by AY observers who observed the group 4. The following is a quote from AY observer transcript:

O_{AY} : The interaction between the teacher and the students was active, with the three boys. But the more active students were RAA and DPZ, they asked the teacher, asked each other. Student KK was silent, but if the teacher explained, he paid attention. For students interaction with other groups, there was an interaction with group 3, then there was also student DPZ who came to group 1 for asking answers. Student RAA also interacted with group 6.

Here’s one excerpt transcript of learning activities that shows the first collaborative skill indicators (asking to friends / teachers when students do not understand) in the group 4:

\[
\begin{align*}
S_{\text{RAA}} &: \text{Were those both not hydrolyzed?} \\
S_{\text{DPZ}} &: \text{It's partially hydrolyzed.} \\
S_{\text{RAA}} &: \text{Help this one.} \\
S_{\text{DPZ}} &: \text{Because CH}_3\text{COO}^- \text{ ions can react with water to produce CH}_3\text{COOH and OH}^- \text{ ions which disturb the equilibrium of water, so that [OH}^-] \text{ is greater than [H}^+] \text{ and thus is base.} \\
S_{\text{RAA}} &: \text{What did it become?} \\
S_{\text{DPZ}} &: \text{CH}_3\text{COOH and OH}^- \\
S_{\text{RAA}} &: \text{What did it become? NH}_4\text{OH?} \\
S_{\text{DPZ}} &: \text{NH}_4\text{OH is weak base.} \\
S_{\text{RAA}} &: \text{Oh, yes weak base. What did it become?} \\
S_{\text{DPZ}} &: \text{NH}_2\text{OH and OH}^- \\
S_{\text{INA}} &: \text{Why OH}^-? \text{ Maybe H}^+. \\
S_{\text{DPZ}} &: \text{Yes. It was neutral} \\
S_{\text{INA}} &: \text{Totally hydrolyzed.}
\end{align*}
\]

Based on the citation of the learning transcript above, RAA students had difficulties and asked their friends. Questions from RAA were then responded by DPZ and INA students. Through asking their friends, the students would trigger the emergence of indicator 2 (being able to speak or argue)
and indicator 6 (showing concern for friends), because other students would answer according to their opinions to help their friends who have difficulties. The emergence of these indicators will lead to mutual learning relationships, for students who had lack understanding and for students who already understand. Thanks to the answers given to friends who did not understand, students who first understood would experience the ‘re-understanding’ [8].

The fifth indicator (Share the tasks of fellow group members well) was the least identified compared to other indicators in each group. One of the reason is because students are more likely to complete their assignments in groups, not divide their assignments with their fellow friends. Based on the results of observations, they ask more questions to friends who already understand or cooperate with other groups.

3.2 Jumping task activities

![Figure 2. Identification of Student’s Collaborative Skill Indicators for Jumping Task Activities](image_url)

Figure 2 shows the appearance of the seven lower collaborative indicators in each group compared to sharing task activities. This is influenced by several factors, namely, the time given in jumping activities is only 20 minutes, less than in the sharing task activity. However, based on the transcript data of jumping task activities, it only lasted ± 9 minutes, this was due to the existence of various obstacles such as learning was started not on time, rearranging student sitting positions so that sharing task activities became longer. Besides the time factor, characteristics of the tasks factors also influence. The characteristics of the tasks given at the jumping activities too challenging, as opposed to the activities of sharing, students were working on tasks such as designing experiment, do experiment, writing tools and materials, writing observational data, answering questions in student worksheet so that in the activities of sharing students can more develop their collaborative skills.

The first indicator (Ask friends / teachers when they don't understand) and the second indicator (able to speak or argue) is most identified in group 5. It happens because group 5 sits at the front, so they are still focused until the end of learning. Based on observer data and learning transcripts, there are interesting findings on indicator 2, which is usually indicator 2 was dominated by high-ability students, in jumping task activities, there are also low-ability students who argue about the assignment given by the teacher. Here's one excerpt transcript of learning activities that shows collaborative skill indicator 1 and 2 in the group 5:

MHR : NaF breaks down into Na⁺ + F⁻. And then?
SAP : Na⁺ add H₂O like before.
MHR : And then?
SAP : Then it's not reacted. Then F⁻ ion react with H₂O.
HHA : So?
SAP : HF + OH
HHA : Wait a minute. So?
SMJ : Because there is acid in our mouth, the fluoride salt in toothpaste can be neutralized.
HHA : This one is just like promag? Correct. Promote is base.
SAP : That’s right. Because stomach is acid.

The fifth indicator (Share the tasks of fellow group members well) is not identified in each group. It occurs because of several factors, namely the characteristics of assignment given in jumping task activities do not need division of assignment, in contrast to the sharing phase, students do more tasks such as design experiments, write tools and materials, write observation data, answer questions on Student Worksheets so that in sharing activities students tend to divide tasks or work together to solve them. Whereas in the jumping task activity students were given the assignment to find out the reason that fluoride salts in toothpaste can neutralize acidity in the mouth, do not need division of tasks, students who do not understand immediately ask the friend who first understand. This is in accordance with Muchtar and Harizal’s opinion which states that the collaboration process will be maximized if the learning process is carried out more complex or varied and followed by assignments that allow students to divide tasks and confirm learning [13].

4. Conclusion
During the learning process through implementation of the design sharing and jumping task on salt hydrolysis topic shows that the seven indicators were identified. The first indicator (asking friends or teachers when they don't understand) are the indicators most often identified during learning, while the fifth indicator (share tasks of fellow group members well) get lowest identified than the other indicators.

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