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Analysis of Student's Misconception and Intrinsic Motivation in the Online-Collaborative Learning

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Abstract: Analysis of Student's Misconception and Intrinsic Motivation in the Online-Collaborative Learning. Collaborative learning in the pandemic situation has some problems to be solved, especially in learning processes. This is done to analyze students' misconceptions and motivations during online learning. The aim of the study was to assess the collaboration process in online learning by using jumping tasks. This is a descriptive research method using the lesson study approach in SMPN 7 Bandarlampung, meanwhile the subject is the student of grade 7. The instruments of research were used observation sheet and questionnaire. Based on the results of observations of the level of confidence of students associated with misconceptions in the material provided, many students answered confidently but did not understand the concept. Misconceptions occurred not only in students who answered incorrectly and with high confidence, but also in students who answered correctly with the wrong reason. This means that students only did (wild guess) or guess with origin. In a nutshell, the provision of jumping tasks in collaborative learning has not been able to minimized the occurrence of the misconception and show the intrinsic motivational in moderate and high level.

Keywords: Misconception, Motivation, Collaborative Learning

Abstrak: Pembelajaran kolaboratif dalam situasi pandemi memiliki beberapa masalah yang harus diselesaikan, terutama dalam proses pembelajaran. Tujuan dari penelitian ini adalah untuk menilai proses kolaborasi dalam pembelajaran daring dengan menggunakan jumping tasks. Penelitian ini merupakan penelitian deskriptif dengan pendekatan lesson study di SMPN 7 Bandarlampung, sedangkan subjek penelitian adalah siswa kelas 7. Instrumen penelitian menggunakan lembar observasi, wawancara, dan angket. Berdasarkan hasil observasi tingkat kepercayaan siswa terkait miskonsepsi pada materi yang diberikan, banyak siswa yang menjawab dengan percaya diri tetapi tidak memahami konsepnya. Miskonsepsi terjadi tidak hanya pada siswa yang menjawab salah dan dengan keyakinan tinggi, tetapi juga pada siswa yang menjawab benar dengan alasan yang salah. Artinya siswa hanya melakukan (tebakan liar) atau menebak asal saja. Simpulannya adalah pemberian jumping task dalam pembelajaran kolaboratif belum mampu meminimalisir terjadinya miskonsepsi dan menunjukkan hasil motivasi belajar pada tingkat sedang dan tinggi untuk motivasi intrinsic.

Kata Kunci: Miskonsepsi, Motivasi, Pembelajaran Kolaboratif

INTRODUCTION

At the end of 2019, the world was rocked by the emergence of a mysterious virus known as COVID-19 (Corona Virus Disease 2019). Pandemic covid-19 (Coronavirus suspended) (Cucinotta&Vanelli, 2020) was declared an international disaster based on presidential decree number 12/2020. Ministry of Education and Culture (Kemendikbud) through Circular Letter number 36962 / MPK. A/HK/2020 on Online Learning and Working from Home in order to Prevent the Spread of Corona Virus Disease (COVID-19) provides instructions to universities to conduct distance lectures through videoconferences, documents and other means to prevent further spread of the virus. This condition causes all areas including education to change. Online learning uses internet facilities and other electronic tools to deliver materials and conduct learning evaluations (Hartley, 2003)

The role of information and technology in the field of education. Emerging Learning Technologies (ELT) from blogging, Integrated Learning Modules, podcasts, Wikis, Browser Improvement, e-learning, M-learning, U-learning have begun to make rapid strides in the teaching-learning process (Sharma et al., 2011). A lecturer is expected to be a facilitator rather than teaching conventionally because the information is easily accessible to students through the internet. Learning by facilitating is empowering both for learners and teachers and frees teachers from many burdens when forced to become an 'expert' (Thiruvengadam, 2012). Blended Learning has received increasing attention (Arbaugh, 2014; Arbaughetal., 2010; Halversonetal., 2014; O'Flaherty& Phillips, 2015). Blended Learning is an innovative concept that has many advantages over traditional classroom learning and ICT-backed learning, including offline learning and online learning (Lalima& Lata Dangwal, 2017). The lesson study approach will be conducted in online learning, so the setting must be similar with the offline lesson study.

A high learning activity is expected to increase students' understanding of the subject matter (cognitive aspects and skills), as well as good management and learning methods are also expected to be able to develop aspects of spiritual and social attitudes among students (nurturant effect). The development of new forms of information and communication technology affects the change in competencies that must be mastered by learners in the 21st century (Higgins, 2014), such as competence in writing, reading, and numeracy into (4C) Critical thinking, Creativity, Communication, and Collaborative (Trilling and Fadel, 2009). The development of thinking skills becomes one of the main goals of modern education to face the challenges of the future (Hafizah et al., 2015). Thinking skills need to be developed especially in the world of education in order for students to be able to compete globally. One of the activities that are student collaboration activities in learning is collaborative learning. The use of appropriate learning models can build students' critical thinking skills. Collaborative learning is one of the learning activities that can improve critical thinking skills. Collaborative learning can improve critical thinking through discussion (Psycharis, 2008) clarifying ideas, and evaluating other people's ideas.

One of the efforts that can be done is to apply the learning method "Sharing and Jumping Tasks". An assignment is a series of activities that must be completed by students in order to achieve learning goals. Sharing tasks and jumping tasks are mandatory to be presented as exercises when they want a collaborative learning process

and high levels of thinking to occur. Jumping tasks are assignments whose material is rather difficult and the level can be rather complicated. This assignment is given with the intention that students can think more critically and be challenged. The students will experience a learning 'leap' to encourage them to think harder and get something out of what is learned. Jumping tasks are given to students while carrying out blended learning to gain motivation, activity, creativity, high-level thinking skills (HOTS), literacy skills, and concept mastery. According to the minister of education and culture regulation (Permendikbud) No. 53 of 2015, assessment of learning outcomes by educators is the process of collecting information or data about student learning achievement on aspects of attitudes, aspects of knowledge, and aspects of skills that are carried out systematically to observe the process, learning progress, and improvement of learning outcomes by the provision of assignments and evaluation of learning outcomes.

In some previous research, the collaborative learning during the pandemic were to selflearning (Thomson, P. et al. 2021), using social media (Khan, N.M. et al. 2021), using mobile enhanced (Rachman, D. 2021; Ciolacu, M.I. et al. 2021; Hasan. I. et a. 2021). There is no specific research about collaborative learning using lesson study approach. It is very important to do this research in the COVID-19 pandemic period which is full of limitations in the learning process in the network. The transition from off-line to online learning requires students to adapt quickly. This causes misconceptions about the subject matter and a decrease in learning motivation. Therefore, this research was conducted to overcome this problem by implementing collaborative learning using jumping tasks. Thus, this is useful for assessment purposes to see the misconception and motivation of students in online learning, especially for collaborative learning.

METHOD

This study used descriptive research method with the lesson study approach in SMPN 7 Bandarlampung for about a month of length was conducted. The subject of research are the students of grade 7 with the topic was about the classification of matter from basic competency 3.3 of the grade 7 science syllabus. The lesson study used as a learning approach, so it involved eight observers in the process, they are a teacher, a lecturer, and six pre-service students.

The preparation of lesson study including discussion with the teacher in charge about the lesson plan, material given in PowerPoint, sharing and jumping tasks, and the assessment. Firstly, the lesson plan must be suited with the original owned by the teacher. Next, the material used only focus on the chemistry topic which was the classification of matter. After all the preparation was ready, the teacher and observers discuss about the document needed in the lesson study. The material of classification of the matter was distributed a week before the lesson study started. Concerning collaborative learning, the subject of research was divided into several groups in purpose according to their prior knowledge and the teacher's notes. So that, in a group must be an outstanding student and some marked students to be observed. The observers only took a note for the marked students (some student who gets a note from the teacher that he/she is being under performance in class). After grouping, they were allowed to discuss the problem in sharing tasks, but cannot in jumping tasks. In addition, the

questionnaire was given at the end of the lesson, along with the interview of the students but the interview with the teacher were held in another day after.

The data collection used questionnaire, observation sheets, interview sheets, sharing and jumping tasks. There were 10 questions used for the collaborative learning activity as one of the research's instruments, which are 6 sharing tasks and 4 jumping tasks. The questionnaire used as data collection and analysis to motivation of students in answering questions. In addition, there are eight indicators of the self-confidence in this study, namely Interest, Perceived competency, Feeling Proud, Effort, Pressure, and Value. This research used misconception diagnostic test with three-tier essay questions as the instrument of research, namely short answer, explanation, and level of confidence. Furthermore, the Certainty of Response Index (CRI) model was used scale from zero to five that indicates the level from Very Not Sure- Not Sure - Hesitate -Sure - Very Sure. CRI is a measure of the level the respondent's confidence/certainty in answering each question given. (Hasan et al., 1999). The questions were constructed in approaching the higher order thinking skill question. Sharing tasks can be used to observe the collaboration process meanwhile the jumping tasks was for higher order thinking skills purpose. Indeed, factual problems were given for them to thinking of. The last, interview sheet was about the preparation, learning processes, and evaluation with the teacher in charge.

The distance learning was conducted by using video conference by Zoom with six breakout rooms and recording features. Another platform for the collaborative activities was used Padlet, simultaneously used to conduct the distance learning of lesson study with Zoom. Padlet provide virtual walls and collaborative spaces that can be accessed from any supported device with internet access (Fusch, 2014). The Padlet lets the students submit their answer just like post it on the whiteboard, so the observer can see the timing of submission. This study tried to conducting the online lesson study as the offline one. Meanwhile, the observers used google docs to record their minutes. Since the students have code of their names, so the subjectivity can be minimized.

RESULT AND DISCUSSION

Collaborative Learning

Collaborative process in the online learning class was given using Zoom and Padlet applications simultaneously which allows learners have discussions in their respective break out rooms for each group and the space given on Padlet. They were given the freedom to have discussions with fellow groups or between groups on the breakout room for the sharing tasks. (Saito et al., 2014) states that there are two tasks that need to be used as an exercise when they want a process of collaborative learning and high-level thinking, sharing tasks and Jumping tasks. They answered the six questions of sharing tasks on the Padlet as shown on the following figure.



Figure 1. Collaborative Learning using Padlet Appearance

Based on collaborative classroom observations and the minutes, students were expected to collab each other in solving the given problems of the sharing tasks but in fact the interaction that occurs is very minimum, even for the first problem that Group F gave no response at all. Each group consists of 3-4 students. Contrary, from the results of the Padlet that successfully observed the average response given only 3 students answered. Based on direct observation, there was also no interaction between students either in one group or with another group. The most frequent interactions happened in group B and D, as predicted on the group B and D, the marked student leads her friends to discuss, she checked her friend's understanding about the problem indeed. The other groups shown medium frequency of discussion according to the minutes of the observers. On the figure 1, it can be seen the arrangement responses given simultaneously with the time they were discussed on the Zoom.

(van Eijl et al., 2005) states by collaborating students will learn more by jointly discovering, collaborative learning will take place if you want to solve challenging problems together with different perspectives. However, some of group did not perform a discussion and collaboration as expected. This contradictive founding can be result from the lack of internet connection, distrust, over confidence among them. Internet connection affect the discussion process, for example a student actually wants to ask about the problem to his/her friend, but the unstable connection act as barrier for him/her, because the lesson study has limited time to be conducted. As noted by the observers, there are some students that have this obstacle, namely student A7, A8, B1, B5, C2, C3, E4, F2, F3, and F4. Another cause is distrust or the loss of trust between students can be happened even though they were allowed to share their knowledge in the sharing tasks, this finding will be discussed in the motivational level. Collaborative learning occurs if students depend on each other due to differences in knowledge and

perspective (Kaendler et al, 2014:505). The challenging issues given to students with differences in knowledge and perspective will provide an opportunity to contribute to each other's ideas and perceptions. Collaborative learning also depends on the level of difficulty of the problem encountered, the easier it will be that students will collaborate, so it takes the material provided with different levels of difficulty each stage. Nevertheless, only weak evidence about this when the interview with the teacher stated that not many of the students has introvert behavior. So that, need more research about distrust of the students in the distance learning. (Saito et al., 2014) revealed that by implementing or providing collaborative learning in accordance with the level of learners, learners who are capable above average or even higher will walk in place. Many of the students too fast answered the jumping tasks, in a result misconception easy to be found from this research. In collaborative-based learning methods that are applied mainly lead to traits that reveal aspects of collectivity methods, collaboration or teamwork, and groups or groupings. The over confidence can be the most problem in the minimum discussion happened. In other word, the collaborative learning through the lesson study in this case does not work as expected because collaborative learning is done when you want to solve a difficult problem together from multiple perspectives. Collaborative learning occurs when students depend on each other because of differences in knowledge and perspectives (Kaendler et al., 2015). It is supported by the result of the misconception below.



Figure 2. Finding Misconception Through

Finding misconception used jumping tasks which are 4 questions with gradual difficulty from the lowest to the highest. Jumping Task is a learning technique in collaborative learning by giving students problems above the student's ZPD level so that there is an interaction between high and low abilities (Anwar et al., 2017). Three-tier tests provide the opportunity for teachers to gain deeper insight about understandings of their students (Kirbulut&Geban, 2014). (Hestenes&Halloun, 1995) indicated that the major problem for using conventional multiple-choice tests was to minimize false positives and negatives, so that he first-tier is short answer not a multiple choices, the second-tier is explanation or supporting answer, and the third-tier is the level of confidence. Details of figure 2 as follow:

Question number 1: the first-tier question is "Pada saat Adi demam, bunda menggunakan thermometer raksa untuk mengetahui suhu ubuhnya. Menurut kamu, apakah raksa termasuk kedalam golongan logam?" (When Adi has a fever, his mother uses a mercury thermometer to check his temperature. In your opinion, is mercury a metal?). Even though there was no error answer, the level of mastery the concept was gradually getting low to the misconception. The misconception happened in eight students. For example, one of the students with the code E5 answered "Ya benar, karena raksa bisa menyebabkan keracunan, dan saya sangat yakin dengan jawaban saya" (Yes, Mercury is a metal because mercury can cause poisoning and I am very sure about it). This shows that this student has high confidence even he cannot support his argument.

Question number 2: the first-tier question is "Hari minggu Vina membuat pempek, tak lupa dia membuat kuahnya dengan bahan air, ebi, gula merah, cuka, dan bumbu rahasia. Menurut kamu apakah cuka termasuk unsur, senyawa, campuran homogen, atau campuran heterogen?" (On Sunday, Vina makes Pempek, she doesn't forget to make the sauce with water, ebi, brown sugar, vinegar, and a secret spice. In your opinion, is vinegar an element, a compound, a homogeneous mixture, or a heterogeneous mixture?). A better response was given for this question. There were seven students a hundred percent understood about the concept of element, compound, and mixture. However, still there were nine students performed lower result. In particular the student with code F2, his/her answer is "cuka adalah senyawa, karena cuka terbuat dari beberapa unsur, dan saya agak ragu dengan jawaban saya" (vinegar is a compound, because vinegar is made of several elements, and I'm a bit dubious about my answer). Low mastery of concept can be characterized by the level of confidence. Indeed, in his/her answer he/she cannot mention the element that composed the vinegar, namely carbon, oxygen, and hydrogen for sure.

Question number 3: the first tier is "Sepulang dari Apotik Ria melihat pada kemasan obat yang ia beli "Kocok dahulu sebelum diminum". Menurut kamu apakah obatnya termasuk unsur, senyawa, campuran homogen, atau campuran heterogen?" (After returning from the pharmacy, Ria looked at the packaging of the medicine she bought, "Shake it before drinking". Do you think the medicine is an element, a compound, a homogeneous mixture, or a heterogeneous mixture?"). This question result error answer category. The error category is given for those who answered wrong, confidence, but the explanation is just correct. Like the student with code F3 answered "Obat itu adalah campuran heterogen, karena obat tersebut tadinya terpisah lalu setelah dikocok baru bias tercampur, dan saya yakin akan jawaban saya" (That drug is a heterogeneous mixture, because that drug was previously separated and then after being shaken it can be mixed, and I am sure with my answer). This student assumes that mutually exclusive compounds are heterogeneous and he/she believes that it is.

Question number 4: the first tier is "*Lihatlah ilustrasi berikut, tuliskan dua huruf yang menunjukan ilustrasi senyawa*?" (Look at the following figure, write two letters that indicates the illustration of compound").



Figure 3. Attachment of question number 4

This question results the most misconception about the submicroscopic representation of element, compound, and mixtures. There were 14 students with this category, with various answers. Here is an example from student with the code C1 "*A dan E adalah senyawa, karena ada dua unsur yang bergabung membentuk senyawa, dan saya sangat yakin jawaban saya betul*" (A and E are compounds, because there are two elements composed it, and I definitely sure about my answer). It can be seen from this answer that this student really confidence about his/her answer, but the content knowledge is just partially understood. The compound is made up of two or more different elements is accepted as shown by figure 3.A. Meanwhile, 3.E is made up of the same elements, so it is actually a molecule.

Based on figure 3 above, only 16 students answered the questions, there were six students did not give response in any reasons. This result shows that in this online collaborative learning where the teacher expects the honestly of the students to answer, some of them interprets it as no comment/no response. The results of observations of the level of confidence of students associated with misconceptions in the material provided, many students answered confidently but did not understand the concept. Even problem number 4 indicates a high misconception with high confidence, there was only one student who can answer correctly, the right reason and high confidence. There was a student who answered incorrectly with the right reason and he was confident, this became a measurement in the category of error. Misconceptions occur not only in students who answer incorrectly and with high confidence, but also in students who answer correctly but also with the wrong reason. This means that students only do (wild guess) or guess with origin. (Admin &Asari, 2017) stated "when students face challenges or subject matter or problems and then exchange opinions with each other collaboratively they have shown mutual respect for each other's togetherness. This indicates that the material or questions given by the teacher will be responded to critically and the student is trying very hard to solve them". This finding shows that the students have not been able to improve critical thinking skills, especially higher-order thinking.

Motivation

Motivation is a complex part of psychology and human behaviour that affects how individuals choose to invest their time, how much energy they use in a particular task, how they think and feel about the task, and how long they stay in the task (Ramli, 2014). This study aims to mapping the intrinsic motivation of the students during the

online learning, especially in online collaborative learning using lesson study. The criteria of motivational level of student uses the following table:

Table 1. Motivational level based on the standard of mean				
Mean	Interpretation			
3.68 - 5.00	High degree of motivation			
2.34 - 3.67	Moderate degree of motivation			
1.00 - 2.33	Low degree of motivation			
(Salamat <i>et al.</i> 2018)				

(Salamat, *et al.*, 2018)

According to the data collected by the questionnaires, then it analyzed using data descriptive to get the mean of the score form Likert scale, there are seven questions indicate the high level of intrinsic motivation of the students. Meanwhile, there are three questions are moderate level. The result as shown in the following table.

Table 2. Intrinsic Motivation Level					
No	Indicators	Question	Mean	Motivational Level	
1	Interest	1	4.84	High	
		7	4.94	Hıgh	
2	Perceived	2	3.21	Moderate	
	Competency	5	4	High	
3	Feeling Proud	3	4.74	High	
4.	Effort	4	4.52	High	
5.	Pressure	9	2.53	Moderate	
		10	4.63	High	
6.	Value	6	4.82	High	
		8	3.26	Moderate	

The motivational questionnaires were divided into six categories, namely 1) Interest, which are question number 1 "I really enjoyed today's science lesson because it was fun" and question number 7 "I'm not interested in online learning today because it's so boring", both questions indicate the student has high motivation in attending the science class. It can be caused of the present of the researcher or the teacher itself as mention by (Fredricks et al., 2004) "A teacher whose behavior expresses a positive attitude and enthusiasm for learning in a particular curriculum subject is more likely to have students who develop a positive influence and enthusiasm for learning and achievement in the subject". 2) Perceived Competency, which are question number 2 "I feel better than my friends in this online learning" and question number 5 "I'm happy to be able to help my friend understand a lesson he's not good at", from these questions can be inferred that the student actually tends to help each other even though their perceived the content was in moderate level. This is quite interesting to figure out if it is compared to the cognitive result and observational sheet in previous discussion. 3) Feeling Proud, which is question number 3 "I feel better when I can do the questions independently and honestly"; 4) Effort, which is question number 4 "I prepare for the lesson well by reading the previous material at least once a week", from question

number 3 and 4, the students feeling their achievement is directly proportional to the effort, this result is also supported by the interview's result, but the result of the cognitive test shows opposite result that the misconception happened in quite big number of participant. This finding points to the collaborative learning can prove that the intrinsic motivation is indirect proportionally to the concept mastery, the students need the confirmation and guidance from the teacher about what they have understood in order there will be no misconception happens in the future. 5) **Pressure**, which are question number 9 "I feel awkward to ask when I can't answer the question" and guistion number 10 "I feel that today's science lesson is difficult to understand", these finding shows the distrust among them, collaboration activity with the sharing and jumping tasks failed to gain their motivation to ask when they did not know the answer. 6) **Value**, which are question number 6 "I believe today's lesson can improve imagination and creativity" and question number 8 "I feel I don't need today's lesson because it is not useful for everyday life", the student valued the collaborative activity in moderate to high level of motivation.

The motivational observation instrument used is to measure the student's internal motivation towards the learning that has taken place. From the results seen students tend to prefer to work / study independently not dependent on friends but very dependent on the device they have. This phenomenon indicates a lack of understanding of the material, a lack of digital literacy, and also a lack of science literacy. The phenomena be seen in the results of this study become a serious problem in the world of education, especially during and after the pandemic. Students tend to perform careless actions seen from the results of high motivation, self-confidence, but with a low understanding of concepts. Wrong answer or right answer with wrong reasons is the parameter of understanding low concept. The questions given are HOTS questions that require a deep thought from some of the concepts they have had before. It is hoped that with collaborative learning social interaction will be built so that the atmosphere of academic discussion is realized in solving the HOTS problem.

- CONCLUSION

Based on the results and discussions, there are some points can be noticed that the provision of jumping task in collaborative learning has not been able to gain higher order thinking skills (HOTS) in students of SMPN 7 Bandarlampung, the provision of jumping tasks in collaborative learning performed moderate to high level of intrinsic motivation of the students, the collaborative learning needs trust among the student, in this study in general can be concluded that the student nowadays is lack of social life because of the pandemic so that they just believed in their selves and hard to find the discussion among them.

In the future, hopefully collaborative learning can be improved so that students can be more involved in social life as collaborative skills become one of the six skills of the 21st century. Thank you Ibu Fitrisia, M.Pd for the cooperation and support in conducting lesson study with the seven graders in SMPN 7 Bandarlampung.

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