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Human Reproduction Contextual Case-Based Worksheet to Improve Students' Interpersonal Communication and Collaboration Skills

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Abstract

Human reproduction in biology is included in the category of a topicthat cannot be sensed directly, but is close to the problems in the daily lives of students. It needs to be optimized in classroom learning, one of which is a worksheet based on human reproductive contextual case studies.This study aimed to find out the effect of human reproduction case-based worksheet on interpersonal communication and collaboration skills. The research method used was one hort case study design involving 68 students of Senior High School in Semarang. The data was analyzed by descriptive quantitative method. The results of the analysis showed that both of student's interpersonal communication and collaboration skills were invery high category.The teacher and student showed a positive response to the use of case-based worksheet in human reproduction learning activity. Based on the results of the study, it can be concluded that the human reproduction case-based worksheet improves interpersonal communication and collaboration skills in Senior High School student in Semarang.The teacher can use this contextual case-based worksheet as an alternative in human reproduction teaching and learning to explore, train and familiarize students' collaboration and communication skills that will be beneficial for their live in the future.

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INTRODUCTION

The 21st-century learning more emphasis group learning than individual learning nowadays. The expected learning outcomes in 21st-century learning are known as communication, collaboration, critical thinking, and creativity (Hakkinen et al., 2016). According to 21st-century skill that is needed in problem-solving is students'communication and collaboration skills (Hermawan & Parsaoran, 2017). Communication and collaboration skills can be developed through science learning, one of which is through biology learning. Human reproduction is a chapter in biology that is enjoyable to students because they can learn about there productive system abnormalities and disorders associated with free sex. Free sex can increase the risk of HIV/ AIDS and other sexually transmitted diseases (Sari, 2018).

The observation in one of the Senior High School in Semarang on September 2018 - January 2019 revealed that the teachers used worksheets from the Forum of Biology Teacher in Semarang as learning media. The worksheets contain material summary, student activities, experiments, investigation, and exercises. They also contain the instructions to do some activities such as observing through a figure in a book or the internet, while the practice exercise contains multiple-choice questions, short answers, and essays. The items provided in the worksheet have not optimally covered the contextualcases that are related to the real-life, especially in the human reproductive system learning and the questions were mostly at the C2 and C3 cognitive levels.

Based on the interview result with teachers, students only learned from the material given by the teacher. Students were less active to explore the material from the other learning sources. Students' communication and collaboration skills were quite low. This can be observed when group discussions and affective assessment of students were conducted. Students tended to be passive especially in the discussion session. There were only one or two students who were actively involved, while the others only followed the answers from their friends. If this is allowed, the students cannot develop their skills.

The ability of students' interpersonal communication and collaboration skills can be developed by giving students an opportunity to find out the material concepts in groups. Then, students can communicate the concept acquired from various learning sources. Therefore, there is a need for learning media such as student worksheet with current cases that related to the teaching material that is called as contextual case-based worksheet. It is a worksheet which provides various real-life examples related to teaching material. In this study, the worksheet applied was human reproduction contextual case-based worksheet. The case was taken from various media, such as the internet, newspapers, or magazines.

Contextual Case-based student worksheet is a worksheet that contains steps for solving problems i.e. organizing and orienting students to learn, guiding the investigations, developing and presenting the works as well as analyzing and evaluating problem-solving processes. The worksheet is adapted from Problem Based Learning (Thhakur & Dutt, 2017). This is in line with the objectives of case-based learning which provide relevant cases and train the students to build their knowledge (Hanim et al., 2017; Hasanah et al., 2019). The discussion method/grouping in the learning process can facilitate students to collaborate, exchange their ideas, help them to understand the material through group discussions, and solve problems in many ways (Utomo et al., 2014). Collaboration skill was improved that 96.43% of the use of case-based worksheet among students through the discussion process and can influence to the improvement of collaboration skill and a significant increase in students' high-level thinking skill (Ilmiyatmi et al.,2019; Ayuningrum & Susilowati, 2015).The case-based worksheet has the advantage of setting up students' learning motivation and practicing their critical thinking through scientific explanation (Allen & Duch, 2015). Therefore, it is necessary to conduct a research on the effect of case-based worksheet towards interpersonal communication and collaboration of high school students in human reproduction lesson. The finding was expected to promote theuse of case-based worksheets as an alternative choice for teacher in teaching human reproduction.

METHODS

This study was conducted at SMAN in Semarang. The research population was class of XI MIPA with 68 students as the samples. The method used in this study was one short case study design. The independent variable in this study was the implementation of contextual case-based worksheet in human reproduction lesson. The dependent variables were interpersonal communication and student collaboration. The communication and collaboration skills of students were accessed by observation, self-assessment, and peer assessment in human reproduction learning

process. The data was analyzed through quantitative descriptive percentage.

RESULT AND DISCUSSION

In this study, human reproduction was studied by students using worksheets based on contextual cases of human reproduction. The worksheet contains contextual cases of human reproduction for students to solve through their learning activitiesthat is beneficial to assess their interpersonal communication dan colaborative skills in classroom. The worksheet was integrated with Problem Based Learning. During the learning process, students' communicative and collaboration skills were measured by observation sheet. An observation sheet of interpersonal communication skills contains indicators of words, volume, and articulation; respons to the other person; convey idea; oral presentation; body language in presentation and interaction during the discussion. An observation sheet of collaboration skills contains indicators of presentations, invertigations, work with other, problem solving, time management, contribution.

Interpersonal Communication Skill.

The interpersonal communication skill of students is presented in Figure 1. The interpersonal communication skill of class XI MIPA students, it is obtained the scores is 90.72 on the aspects of the word, volume, and articulation. This aspect got the score is very high, because most students had been able to convey ideas with good sentences, loud volume, and clear articulation. This aspect can be observed when students did presentations in front of the class. Most of the student, stated that they were able to express their opinions on the results of problem-solving on a contextual case-based worksheet in front of the class with good sentences, loud volume, and clear articulation. It could be seen that students had confidence when presenting in front of the class. The score is 83.65 of class XI MIPA students is on the aspect of conveying ideas. When did discussions with human reproduction contextual case-based, not all group members play an active role and participate. The lack of participation of some students was triggered by several factors, namely, students were less motivated to learn, lack confidence in conveying ideas, and were afraid of being wrong. This is due to internal factors of the students themselves. Based on Riyani's research (2015), the factors that influence students' learning motivation are teaching and learning processes, learning media and teaching materials, interaction and interest in the material, as well as goals and talents. The study was strengthened by research (Sutrisno & Siswanto, 2016) student motivation has a significant influence on student participation in the material.

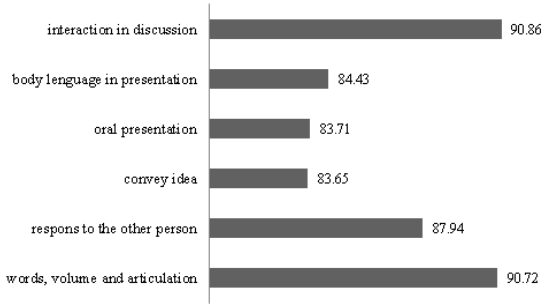

Figure 1. Interpersonal Communication Skill Results of student in class of XI MIPA

Based on the data obtained, interaction in discussion shows highest value. That result was obtained because when the discussion took place, the group members were actively involved in carrying out their roles in completing activities in the worksheet.

The members shared the tasks and gave their ideas in completing activities in the worksheet. That kind of activity encourages students to express their opinions in accordance with language and knowledge about human reproductive problems in class. Interaction activities inside and outside the group encourage students to be brave in expressing their opinions so as to support their ability to communicate personally with group members when discussing about human reproductionissues. This statement is supported by Warsono (2017) which stated that interacting students can develop their interpersonal communication skill.

Another reason that can be explained to support that learning the human reproductive system by presenting contextual cases related to the material is able to encourage students to regulate their knowledge is that students are able to solve the real problems through opinion activities while discussing. The solution of problem solving is obtained by students when learning human reproduction students focus on problems in daily life that are very close to him in groups. Learning activities carried out in groups can encourage students to practice their ability in making the opinions, responding to other students' questions, speaking using appropriate words and processing words to express their opinions independently. This statement is in line with Arends (2014) and

Hasanah et al. (2019) that stated that learning is focusedon the real problem solving, students carry out group work, discussion, and get feedback in completing a task through investigation and when conducting learning by presenting the case, students can improve their communication skill.

Interpersonal communications aspects of body language can be observed when students hold discussions and presentations. When discussing, there were several students who expressed their opinions with inappropriate attitudes. Some students were not serious and did not focus on the discussion topic when conveyed the ideas to the member in their own group, while during the presentation, there were some students who lack of confidence in conveying the results of their ideas. Lack of confidence in students was caused by the lack of student ability to express their opinions orally in front of their friends and afraid that they would be laughed at by their friends if the answer was wrong. Students seemed to be afraid of interacting with the audience, and instead, sometimes they only focused on the notes that were brought.

The students' interpersonal communication skill in all aspects reached in very high criteria (Figure 1). Students were able to achieve very high criteria because they could follow the learning steps in contextual case-based worksheet well. Learning raised the real cases that are related to the teaching materials and adjusted to the learning steps, so communication skill was more directed (Saenab et al., 2015). The case-based worksheet are integrated withsyntaxof problem-based learning (PBL) model and might develop students' communication skill. PBL with scientific issue would affect the development of critical thinking and communication skills (Wilsa et al., 2017).

The interpersonal communication skill can be observed and measured at each stage of learning with case-based worksheet. In the identification stage (problem identification), the students who involved in one group member identified the facts, then formulated a fact-based problem that had been found in each case. Students read, observed, understood, and analyzed cases presented in the worksheet. Furthermore, students conveyed the problems (organization) that had been found to friends in the same group. Students should discuss in group to write the formulation of the problem in the form of question sentences that indicated the existence of relationship between variables in the worksheet. When writing the answers, students could not immediately see and copy the answers written in the article, but they should read, examine, and analyze the articles to draw conclusions as the answers.This statement is in line with Kono et al. (2016) who stated that reproduction case-based worksheet trained students to formulate problems with their critical thinking skills so that the students are able to develop concepts of knowledge independently.

The next stage was research stage (stage of scientific investigation). In this stage, students became more active. The active role of students can be observed from increasing student contributions at each meeting. At the beginning of the meeting, there were some students who did not participate in group discussions. This is because some students always seemed embarrassed to express opinions, had not been able to adjust to problem-based learning and were less motivated. However, started from the second meeting, the students began to have the courage to express their opinions to their group member. In addition, students became more creative in utilizing learning resources to find the solution. On the topic of menstruation and fertilization, there was a group that presented answers by analyzing the video of the fertilization process to their friends. It made the classroom more alive, and students became more active in giving responses.

The product performance stage (the stage of delivering results) was conducted through a presentation. Most students were able to present their presentations well, so they were able to fulfill the six aspects of interpersonal communication skills. However, students stated that when presenting the presentation they thought that the volume was not loud, the grammar was not proper, and the articulation was not clear. It created a feeling of lack of confidence to students. The case-based worksheet in this study can be said to have a positive effect on interpersonal communication skill because the acquisition of interpersonal communication skill was in very high category and the implementation of learning with contextual case-based worksheet conducted by students and teachers was in the excellent category. This research is in line with the results of research by Fitriliani et al. (2017) on the effect of applying problem-based learning to students' problem solving and communication skill. The results of the study showed an improvement in students' communication skill to very good (Lubis et al., 2018).

The positive response was given by students towards the application of human reproduction contextual case-based worksheet in human reproduction lesson. There were 94,1% of students stated that human reproductive contextual case-based worksheet could improve their

interpersonal communication skill. The teacher also gave a very good response. They supported the use of the worksheet to be applied in reproductive system lesson. The teacher suggested that the use of contextual case-based worksheet is not only applied to reproductive system, but also to other chapter in Biology.

Collaboration Skill

The collaboration skill of students was assessed from the observation, self-assessment, and peer assessment that were carried out during the learning with human reproduction contextual case-based worksheet. The aspects of collaboration skills measured were contribution, time management, problem-solving, teamwork (work with other), investigation techniques, and group presentation. The result of student collaboration skill is presented in Figure 2.

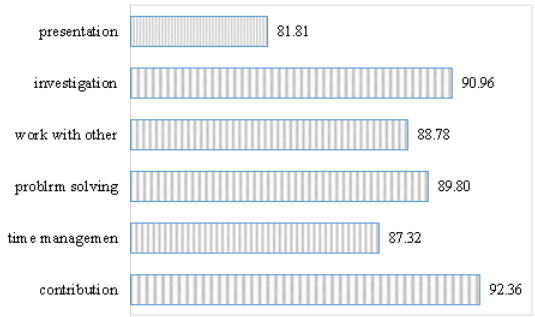

Figure 2. Collaboration Skill Result of Class of XI MIPA

The overall of student collaboration skill has met all aspects with a very high category in both classes. This achievement is because students were able to follow the learning steps in the contextual case-based worksheet very well. Based on Figure 2, the collaboration skill of students in the aspect of contribution showed the value with the highest average among all elements. During the discussion, students in one group member worked together. Through small group collaboration activities, students learn to think criticallyto complete assigned tasks in groups (Fitri et al., 2018). Each group member had their roles, some of them were read, examined and analyzed the case and the others were looked for answers from the learning resources, submitted ideas, and wrote the answers. In each group, there were students who did not participate in the group. Those students contributed only one or two times, they had not been motivated to learn, had not adjusted to group members' friends, were not used to working in groups, and still felt shy to convey the ideas to their friends. The lack of student contributions during the discussion was seen in the first meeting of activity about the structure of the tissues and reproductive organs and gametogenesis. In the next activity, students had begun to get used to the learning with contextual case-based worksheet. Students began to encourage themselves to make the best contribution to their group, they also became more trustworthy and able to adapt to fellow group members, so that the collaboration in groups could be well established. According to the Ayuningrum & Susilowati (2015), case-based worksheet could improve collaboration among students through discussion. According to Greensteen (2012), collaboration is more than just participation in discussing specific topics. Collaboration is collaborating by considering different perspectives, contributing, listening, and providing support to group members.

The collaboration skill in the presentation aspect has the lowest score (Figure 2). It is because when the group presented their results of discussion, there were some students who pay less attention because they were busy with their groups to prepare the presentation. The interaction between presenters and audience was less, only a few students who gave the responses. However, the teacher did not remind students who did not pay attention and participated in the learning process. Teacher assistance is essential during the learning process to create a conducive atmosphere, and students can be easier to understand the material. Based on the theory of constructivism, students work with peers by mentoring people who are considered to know better to make teaching and learning activities more effective. The other factors were caused by the presenters that felt less confident when presenting in front of their classmates because they had not fully mastered the presentation material resulted in lack of interaction between presenters and audiences.

Each stage of learning with the case-based worksheet requires collaboration between group members. In identification stage (problem identification stage), the students in a group worked together to find the facts in the article that had been presented. The group leader divided the assignments for each group member, there were students in charge of reading and looking at cases, finding solutions from learning sources, and writing answers. This stage helped students to find students solving problems. Students should be able to analyze the cases presented first to determine the problem. In the activity about organ structure and tissue, it was seen that students had difficulty in finding the facts of prostate and cer-

vical cancer cases presented in case-based worksheet. Most of student answers did not direct to problems that were currently in the focus of the case prostat and case servic cancer issues, which made students faced difficulty because students did not yet know how to find facts based on the problems that were presented in the case-based worksheet. In activity about Gametogenesis and subsequent activities, students were able to analyze facts and problems that were the focus of the cases presented, students began to get used to human reproduction contextual case-based worksheet.

Organization (formulating problems) stage became the basis of students to solve the problem through a hypothesis. At the stage of solving the problem, students must examine and understand the case/ problem first and the student can conclude. Some students seemed to argue to determine the right solution based on the issues they faced. The students respected and accepted differences of opinion. Students collaborated the ideas that they had found to be the best solution. The results of student collaboration were evidenced by the score of the worksheet in each activity. The group that could cooperate well will get the highest score of the worksheet.

Scientific research make students become more active and creative in doing the problem-solving. The teacher advised students to use learning resources such as books, newspapers, articles, and the internet to help finding the solution of the problem. Each group member divided the tasks in finding the solution. Some of them were searching for references in the internet, looking for books, newspapers, or articles. Then the answers that had been found were collaborated to obtain the best solution for the problems encountered. Learning by using contextualcase-based worksheet familiarizes students with real-life problems, so they can develop their skills to find solutions in various aspects and learning resources (Saenab et al., 2015; Melawati et al., 2014). At the stage of problem-solving, students have an understanding of new concepts and can think complexly to describe each problem which ultimately direct to problem-solving. Problem-based learning can help students to reduce bad habit that do not want to share their opinions. Besides, it can also train students to build a teamwork with others (Sarmini, 2016).

At product performance (delivering results stage), the results of the discussion were communicated by presentation. Each group presented the results of group work to their classmates. The presentation could help students to understand the problems they faced, it is because students appeared in front of their classmates with various questions from the audience, so that the presentation group performed as well as possible. When the group presented at the beginning of the meeting that was about prostat cancer and servical cancer, there were some students who were still embarrassed to show the results of their group discussions, lack of confidence, and had poor time management. Each group was given 10-15 minutes for the presentation, but only 3-4 groups from 7 groups in each class that finish edit on time. The time management aspects was seen to be poor in presentation about prostat and servical cancer. Other obstacles were students were difficult to be controlled, lack of attention to teacher instructions and lack of focus and understanding of presentation material. The collaborative skill of students in the proscess of reproduction material is very good and began to adjust to human reproductioncontextualcase-based learning well. Utomo et al. (2014) stated that presentations can motivate students to perform with the best results, understand, and master the problems presented, and can deliver presentations smoothly. Group presentations can train students' collaboration skills in presenting the material well (Halim & Murasal, 2017; Waite & Davis, 2016).

Human reproduction contextual case-based worksheet has a positive influence on students' collaboration skill. Besides, it is being seen from the syntax implementation of learning that was carried out by teachers and students in very high categories and accordance with the implementation plan of learning. This is supported by Barrows (2009), that case-based learning is designed to develop problem-solving skills and requires activities that involve students in full, fosters students' thinking skill, and it can create independent learning as well as learning in a group. Research by Ilmiyatmi et al., (2019) showed that learning by presenting cases influences the improvement of collaboration skill and enhancement of high-level students' thinking skills. Moreover, a research by Muiz et al., (2016) showed that learning by presenting case influences the improvement of student's collaboration skill.

Students' responses to human reproduction contextual case-based worksheet, namely 97.03% stated that human reproduction contextual case-based worksheet could improve students' collaboration skill. The use of this worksheet also received a positive response from the teacher. The teacher agreed that contextual case-based worksheet on human reproductive system could enhance students' collaboration skill. The teacher's

advice on the use of human reproduction contextual case-based worksheet is to add more varied questions and focus on the indicators that will be achieved. The obstacles in using this contextual-case-based worksheet were time limitation and classroom management. However, teachers need to work hard and be creative in choosing teaching materials for effective and efficient learning. The material of teaching one of choice is the human reproduction contextual case-based worksheets to integrated Problem Based Learning models.It can improve students' communication and collaboration skills after previously according Kono et al. (2015) states that learning contributions case-based is able to develop concepts of knowledge independently. For this reason, teachers can use case-based worksheets as an alternative inhuman reproduction lesson. The beneficiaries are able to explore the potential, train, and get used to the interpersonal and collaborative communication skills needed by students to live in the future.

CONCLUSION

Human reproduction contextual case-based worksheet can improve interpersonal communication and collaboration skills of senior high school students. Teachers can use the worksheet as an alternative in teaching human reproduction. The worksheet can be used to encourage students to learn contextually about human reproduction. It also helps teachers to explore potential, as well as to train, and familiarize students with 21st century skills which include communication and collaboration skills apart from critical and creative thinking.

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