The Effectiveness of the Think Pair Share Model Based on Questions to Improve Students’ Participation and Students’ Learning Outcomes about Histology Structure of Digestive System

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Abstract. This study aimed to determine the effectiveness of Think Pair Share learning based on questions models to increase students’ participation and learning outcomes in studies of the histological structure of the digestive system. To achieve these objectives, research was conducted on the Biology study program at the Faculty of Mathematics and Natural Sciences, Ganesha University of Education. Research sample was the second semester students, amount of 17 students. The design of this study was one short case study. Instruments used in this study included questionnaires and observation sheets to assess students’ participation and responses in learning, and knowledge tests to assess student cognitive learning outcomes. The results obtained by the value of students’ participation were 47.1% in the good category and 47.1% in the very good category with an average value of 83.12. Cognitive learning outcomes obtained a mean value of 76.0. Students who got a greater or equal value of 70.0 were 76.5%. The conclusion of this research were that the Think Pair Share Learning model based on questions could increase students’ participation and learning outcomes in the study of the Histological Structure of the Digestive System.

Keywords: Think Pair Share, Based on questions, participation, learning outcomes

1. Introduction

The quality of human resources can be increased by improving the quality of education. The improvement of education is an integrated process with the process of human resources improvement. It has a connection with the improvement of learning quality at school and university. The learning quality improvement is determined by the learning model used in learning a certain concept. The selected learning model is a model that can increase the students’ ability to think and increase participation and students’ activity so that students have an improvement in their study results.

Histology is a study of the microscopic structure of body tissues. The understanding of body tissues are basic to learn the physiological processes of organs and organ systems. The microscopic structure of tissue and organ has a connection with the function of tissues and organs. The histology subject is one of the subjects taught in the Biology Education and Biology Study Program. The result of this
study on Histology, especially in the subject matter of the histological structures of organs in the digestive system in the past 3 years as follows.

1. The academic year 2016 - 2017, the average value obtained was 63.53, and students who got a ≥ 70.0 were 28.6%
2. The academic year 2017 - 2018, the average value obtained was 65.74, and students who got a ≥ 70.0 were 33.3%
3. The academic year 2018 - 2019, the average value obtained was 60.75, and students who got a 70.0 were 25.0%

The students who took the histology class, it was stated that histology was a difficult subject. The student’s difficulties on studying histology are tissues identification in structures of three-dimensional preparation or organs in a flat and two-dimensional preparation or atlas. On the order hand, histological preparations do not cut right on the lengthwise or transverse section, resulting in variations in the appearance of the preparations depending on the slice [1] (Victor, 2003). Therefore, students was difficulties to imagine and identify the tissue and organ structures.

The results of observations made during lectures on the material structure of the histology of organs in the digestive system, obtained the facts of learning as follows.

1. Student responses to lecturer explanations and questions are low
2. Student initiatives to ask is less
3. Few students are willing to answer
4. Students do not have the will to express their opinions
5. Most students only listen to lecturer explanations in learning activities

Based on the learning outcomes and observations of the lecture process, it is necessary to innovate of the histology learning model. The model used is a model that can develop students' thinking skills, increase participation, and student learning activities. Question is alternative that can be used to develop thinking skills. Asking questions is important techniques used by teachers and to achieves learning objectives. Callahan et al. [2], states that, there are 20 objectives teachers use questions, namely: 1) to give instructions, 2) to find something that is not known by the teacher, 3) to know whether students know something, 4) to develop students' thinking abilities, 5) to motivate student learning, 6) to provide training and practice, 7) to help students organize material, 8) to help students interpret material, 9) to emphasize important things, 10) to show relationships, such as cause and effect, 11) to know students' interests, 12) to develop appreciation students, 13) to give an assessment, 14) to give expression practice, 15) to express mental processes, 16) to show agreement and disagreement, 17) to make a report, 18) to diagnose, 19) to evaluate, and 20) to get attention. Cotton [3] elaborated that, there are seven purposes of asking questions, namely: 1) to develop students' interest and motivation to be actively involved in learning, 2) to evaluate readiness, check homework or assignments, 3) to develop critical thinking skills and inquiry attitudes, 4) to repeat and summarize the previous lesson, 5) the development of insights by linking with new things, 6) to assess the achievement of learning objectives, 7) to encourage students to hunt for their own knowledge.

To increase students’ participation and activeness in lectures, it can be done with a Think Pair Share (TPS) model. The TPS model is a type of cooperative learning that is designed to influence student interaction patterns and to optimize the student’s active role in learning activities [4] (Lie, 2004). TPS model also trains students to express their opinions so they can hone their thinking skills and discuss to get concepts or answers to the problems being studied [5] (Imkari, 2012). Think Pair Share is a model that allows students to work alone and collaborate with others. The advantage of TPS is the optimization of students' participation [6] (Isjoni, 2014).

TPS model consist of three stages namely thinking (Think), pairing (Pair), and sharing (Share). At the thinking stage, the lecturer presents a question or problem about the subject matter to be studied, and students are allowed to learn independently to find answers to these questions and problems. At the sharing stage, students are asked to pair up with other students, then discuss what has been obtained at the thinking stage. Interactions that occur between students to determine the most
appropriate answer to the question or problem is given by the lecturer. The next stage is sharing. At this stage, the lecturer asks each group to present the results of their discussion [7] (Slavin, 20015).

In this study, TPS question-based was implemented to optimize the histology learning activities. Asking questions was one of the activities used as a basis for conducting investigations and discovering science concepts and principles learned by students. In histology lectures, the syntax of the question-based TPS model was packaged in a worksheet. The questions on the worksheet were written down at the Think stage. Based on the results of previous studies showed that questions could improve knowledge and science process skills [8] (Adnyana and Citrawathi, 2017), and TPS could improve student learning outcomes and learning activities was reported by Afoan, et al. [9] (2016) and Budiati [10] (2018). Based on the results of research that had been done showed, the purpose of this study was to determine the effectiveness of the TPS model based question to increase students' participation and learning outcomes in learned of histology of human digestive system.

2. Method

This research was conducted by a pre-experimental study with One Short Case Study Design (Figure 1)

| Treatment | Test |
|-----------|------|
| X         | O    |

X = Learning using Question-based TPS Model (Independent Variable)
O = Observation or Test Result (Dependent Variable)

Figure 1. One Short Case Study Design

The research subjects were all the students of Biology Study Program in second semester of the academic year 2018 - 2019 who attended the histology lecture. The numbers of research subjects was 17 students. Data collection instruments used interview guidelines, observation sheets, tests, and questionnaires. The interview guidelines were used to interview research subjects related to the difficulty of studying histology. Observation sheets were used to observe students' participation and learning activities. Student learning outcomes obtained from the results of objective tests and descriptions, and questionnaires to determine student responses to the learning model applied. The learning tools used in this study included syllabus, semester lesson plans, student assignments plans, teaching materials, and question-based TPS worksheets. The results of the study were analyzed descriptively quantitatively. To determine the effectiveness of the model used was based on student learning outcomes, participation, and response to learning. The TPS model based question was declared effective if 75% of students scored ≥ 70, 75% of students participated either well or very well, and student responses to the learning model were in a good category.

3. Results and Discussion

3.1 Learning Outcome

Based on research result showed, that the cognitive learning outcomes of students using a TPS model based question on histology lecture is point out on Table 1.

| Table 1. Student Cognitive Learning Outcomes Using TPS Model Based Question |
|-----------------------------|-----|
| Category               | Score |
| Lowest score           | 62   |
| Highest score          | 94   |
| Average                | 76   |
Students who scored ≥ 70 were 76.47%. This showed that the TPS model based question was effective for improving learning outcomes. Ni’mah and Dwijananti [11] (2014) and Afoan, et al. [9] (2016) states that the TPS model could improve student’s learning outcomes. The TPS model could motivate students to learn, because TPS provided opportunities for students to actively think through the problems being studied, look for learning resources or teaching materials, then discuss them with their partners.

In learning the histological structure of the digestive system, the TPS model was used based on questions, because the role of questions could encourage students to hunt for their knowledge, develop critical thinking skills and inquiry attitudes, and develop students’ interest and motivation to become actively involved in learning [3](Cotton, 2012). Whereas, Callahan et al. [2] (1992) stated that the role of questions in learning included developing students' thinking abilities, motivating student learning, helping students organize material, helping students interpret material, and to emphasize important things. The implementation of question-based was packaged in a worksheet that would guide students to learn the histological structure of the organs of the mammalian digestive system. The questions contained in the worksheet lead students to identify, discover, interpret and determine the relationship and function of the tissues that made up the organs of the digestive system. Question-based worksheets encouraged students to find their concepts learned both in the thinking stage and in the sharing stage with their partners. Answering questions on a worksheet could stimulate students' thinking skills. Questions could spur student learning processes which would ultimately lead to improving learning outcomes. The results of this study were in synergy with the results of research by Adnyana and Citrawathi [8] (2017) that the question-based module could improve knowledge and skills in the science process. According of Citrawathi and Adnyana [12] (2018) stated that the question-based module could increase the science process skills in the subject matter of the food digestive system.

3.2 Students’ Participation in Learning

Cooperative learning trained students to actively participate and communicate. This ability was very important as their provision in life in the future community [13] (Sanjay a, 2009). To be able to participate and communicate, in the learning process, a model was chosen that allowed students to participate and practice their communication skills. The TPS model could be used to increase students' participation [14] (Huda, 2014). The TPS model allowed students to think while studying on their own (think), and cooperate with their groups (pair), and share information with other groups (share). Indicators of participation assessed in the question-based TPS model were: (1) giving opinions for problem-solving, (2) giving responses to other people's opinions, (3) working on assignments given by lecturers, (4) presentation of assignments, (5) tolerance and willing to accept the opinions of others, and (6) responsibility to group members [15] (Khodijah, et al., 2016). Data of the students’ participation in lectures with question-based TPS model showed in Table 2.

| Interval Score | Frequencies | Percentage (%) | Category   |
|----------------|-------------|----------------|------------|
| 0 - 60         | -           | -              | Very less  |
| 61 - 68        | -           | -              | Less       |
| 69 - 72        | 1           | 5.80           | Adequate   |
| 73 - 84        | 8           | 47.10          | Good       |
| 85 - 100       | 8           | 47.10          | Very Good  |
| Total          | 17          | 100            |            |

Students were encouraged to actively participate in learning by applying the TPS model at both the Pair and Share stages. Students' participation in discussion activities raised interactions between students and students, and students and lecturers. Students who actively participated in learning had greater opportunities to understand and remember subject matter compared to passive students. Students who participated and interacted well in learning would master the subject matter because the
formation of knowledge occurred through interaction. Through interaction, a student could compare the thoughts and knowledge he had formed with the thoughts and knowledge of other students. Students were challenged to develop their thoughts and knowledge. Group challenges would help students to assimilate and accommodate their knowledge schemes. Improving learning outcomes due to interactions between students, and between students and teachers also stated by Dewi, et al. [16] (2013). As also stated by Ostroff [17] (2013), that when discussing in groups, students were simultaneously active participants and also observers. So, in TPS model based question gave students experience to do, meanwhile, students also internalized the thoughts of other students. The question-based TPS model encouraged students to find out the answers to the questions submitted at the beginning of the material to be learned or the beginning of activities to be carried out in the worksheet.

3.3 Student Responses to the Question-based TPS Learning Model

Student responses to learning were classified as very good (very positive), with a score of 85.1. Student responses are behaviors that arise due to the stimulus given by the teacher to him, or responses in learning something with a feeling of pleasure. Student response was one important factor that also determined the success of students in learning a concept. Muctadi et al. [18] (2017) states that there is a significant relationship between student responses to learning outcomes. The statement of Muctadi et al. [18] (2017) was supported by Marmeli and Husni [19] (2018) who suggested that students' responses to learning were very important to improve learning outcomes. Lack of student response to the material being studied could obstruct the learning process. The low response of students to learning was not necessarily caused by the difficulty of the teaching material being discussed, but it could be caused by the teacher's ability to deliver the teaching material with inappropriate methods, the teacher's voice was too small, not assertive, making students afraid and tense so it became less attractive and caused boredom to students. Less conducive learning atmosphere could decrease student response.

Lecturers had an important role in building an atmosphere of effective and fun learning. If the lecturer plans to learn carefully along with effective breaks and activities that made students physically active, teach with high enthusiasm and build positive relationships with students, therefore students would respond positively to learning. This positive response was a good start so that students were interested in participating in the learning process seriously to achieve optimal performance. TPS learning model based on questions on the subject matter of the histological structure of the digestive organs responded positively by students. This meant that the TPS learning model facilitated by question-based worksheets made learning the histological structure of the digestive organs was more enjoyable. Citrawathi and Adnya [12] (2018) suggested that a pleasant atmosphere is one of the most important things in learning. Student positive responses to learning can improve learning outcomes.

4. Conclusion

The conclusion of the research were that the Think Pair Share model based on questions can be increase student participation and learning outcomes in the study of the histological structure of the digestive system. Student participation 47.1% in the good category, and 47.1% in the very good category with an average value of 83.12. Cognitive learning outcomes obtained a mean value of 76.0. Students who get a greater or equal value of 70.0 were 76.5%. Student responses to learning are classified as very good or very positive, with a value of 85.1.

References

[1] Victor, P.E. 2003. Atlas Histologi di Fiore dengan Korelasi Fungsional. Jakarta : EGC
[2] Callahan, J.P., Clark, L.H. & Kellough, R.D. 1992. Teaching in Middle and Secondary Schools. United State of America : Macmillan

[3] Cotton, K. 2012. Claasroom Question. On line: http://-69.20.125.200- workshop. Accessed 17 Mart 2012

[4] Lie, A. 2014. Mempraktekkan Cooperative Learning di Ruang Kelas. Jakarta : PT Gramedia Mediasarana Indonesia

[5] Imkari, S. 2012. Pengaruh Pembelajaran Think Pair Share dan Pola Pemberdayaan Berpikir terhadap Kemampuan Berpikir Kritis, Hasil Belajar Kognitif, dan Retensi Mahasiswa Biologi. Malang : Universitas Negeri Malang

[6] Isjoni. 2015. Cooperative Learning : Efektivitas Pembelajaran Kelompok. Bandung : Alfabeta

[7] Slavin, 2005. Cooperative Learning. Bandung: PT. Nusa Media.

[8] Adnyana, P.B. and Citrawathi, D.M. 2017. The Effectiveness of Question-Based Inquiry Module in Learning Biological Knowledge and Science Process Skills. International Journal of Environmental & Science Education. 12 (8), 1871-1878

[9] Afoan, M.Y., Sepe, F., Djalo,A. 2016. Efektivitas Penerapan Model Pembelajaran Think Pair Share (TPS) terhadap Hasil Belajar dan Aktivitas Siswa pada Materi Sistem Pernafasan Manusia. Jurnal Pendidikan. 1 (10): 2054 – 2058

[10] Budiati, A. 2018. Efektivitas Pembelajaran Kooperatif Think Pair Share untuk Meningkatkan hasil Belajar IPA di MTs N Gondowulung. Jurnal Pendidikan Madrasah. 3(1), 65 – 76

[11] Ni’mah, A. dan Dwijananti, P. 2014. Penerapan Pembelajaran Think Pair Shate (TPS) dengan Metode Eksperimen untuk Meningkatkan Hasil Belajar dan Aktivitas Belajar Siswa Kelas VIII MTs NahdlatulMuslimin Kudus, (on line). (http://journal.unnes.ac.id/sju/index.php/upej/article/download/3593/3205)

[12] Citrawathi, D.M. and Adnyana, P.B. 2018. Question-Based Inquiry Module can be to Increase Science Process Skills on The Study of Human Digestive System. International Conference on Science and Technology. Journal of Physics: Conf Series 1116 (2018)052016

[13] Sanjaya, W. 2009. Strategi Pembelajaran Bertorientasi Standar Proses Pendidikan. Cetakan ke-6. Jakarta: Prenada Media Group

[14] Huda, M. 2014. Cooperative Learning. Pustaka Pelajar : Yogyakarta

[15] Khodijah, D.H., Hendri, M., Darmaji. 2016. Meningkatkan Partisipasi dan Hasil Belajar dengan Menggunakan Model Pembelajaran Kooperatif Tipe Think Pair Share di Kelas XI MIA\7 SMAN 1 Muaro Jambi. Jurnal EduFisika 1 (2), 46 – 54

[16] Dewi A.N., S. Dwiastuti, dan A.A. Prayitno. 2013. Pengaruh Penggunaan Model Active Knowledge Sharing terhadap Hasil Belajar ditinjau dari Minat Belajar Siswa SMAN 2 Karanganyar. Makalah Hasil Penelitian. Disampaikan dalam Seminar Nasional IX Pendidikan Biologi FKIP UNS.

[17] Ostroff, W.L. 2013. Memahami Cara Anak-anak Belajar: Membawa Ilmu Perkembangan Anak ke dalam Kelas. (B. Sendra Tanuwijaya, Pentj). Jakarta : PT Indeks

[18] Muchtadi, Hartono, and Oktaviana, D. 2017. Hubungan Aktivitas dan Respon terhadap Hasil Belajar Program Linier melalui Penerapan Pembelajaran Genius Learning pada Program Studi Pendidikan Matematika. EduSains: Jurnal Pendidikan sains & Matematika. 5 (1), 45 – 50
[19] Marneli and Husein, 2018. Chemistry Education Student Response Toward General Biology Course: A Descriptive Study. Indonesian Journal of Biology Education. 4 (2), 143 – 150