Think-Pair-Share Strategy Using Smartphone to AssistIn-Class Formative Assessment

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ABSTRACT

Think-Pair-Share strategy is a cooperative learning technique that encourages individual participation through questions. Recent study indicated that a fair number of students chose not to participate in this learning activity. To address this issue, in-class measurement and assessment of student understanding has been developed. Based on a client-server model, the Student Response System (SRS) adopted the think-pair-share strategy using students' smartphone as clients. Three distinct levels of answering the questions were asked; i.e. in the think phase, students independently develop their own ideas on the specific topic that has been asked, while in the pair stage, students discuss their view with a partner that allow students to express their thoughts and ideas while considering those of their partner, and finally, in the share phase, students share their refined ideas with a larger group such as the whole class with the support of their partner. On the server side, responses from students on questions posed can be automatically viewed by instructor during the Teaching and Learning process. Initial result is encouraging, i.e. experiment with a group of students has managed to improve assessment of their understanding up to seventy percent, while helping to improve students' socialization processes through interactions among students while strengthening their cognitive and affective domain.

Keywords: *Active learning; Computer-assisted instruction; Cooperative learning;*

INTRODUCTION

Frequent feedback about the quality of student learning by using formative in-class assessment during the learning process often helps instructor to find out if learning is taking place, what students are learning and how well they are learning (Cowie & Bell, 1999). Based on this gathered information, the instructor could act on the post-assessment and may customize the teaching and learning activities in order to promote further improvement of student attainment (Crooks, 2001).

Normally, when an instructor asks questions, only a few students would actively participate in the discussion. Hence, this may pose difficulty for the instructor to gauge the level of understanding for the rest of the class. One formative assessment tool that helps solve this problem is known as think-pair-share strategy (Lyman, 1981; Sumarsih & Saragih, 2012; Raba, 2017; Demetry, 2010; Webb, 2009).

Think-pair-share strategy is a cooperative learning technique through questions via three distinct levels: Think Pair and Share. First, students quietly think about a question given by the instructor. They independently think about this question by themselves before making a response. Second, students pair with a partner to share and discuss their view. This allows students to express their thoughts and ideas while considering those of their partner. Then, the pairs of students will decide which answer is the best. Lastly, students share their answers with the whole class with the support of their partner (Lyman, 1981; Sumarsih & Saragih, 2012; Raba, 2017; Demetry, 2010; Webb, 2009).

However, current study indicated that a fair number of students (perhaps 10-15%) chose not to participate in this active learning activity (Demetry, 2010). To remedy this problem, technology is often seeks as a tool for students to engage in their learning by enhancing the learning environment to be more conducive, interactive and relevant (Gok, 2011).

Addressing this concern, a client-server application of the think-pair-share strategy using Android application installed on students' smartphone as clients has been developed. Here, an instructor will get faster response on the level of student's understanding on the topic covered in the current session so that the instructor can do immediate assessment and act on the result.

This paper is organized as follows. Section 2 outlines the related works on think-pair-share strategy and Student Response System (SRS). Section 3 introduces the implementation of think-pair-share strategy in the client-server model. Section 4 elaborates on the experiment conducted. Finally, Section 5 provides the conclusion.

RELATED RESEARCH

There are numerous researches that have been conducted on think-pair share strategy, a cooperative learning technique developed by Frank Lyman at the University of Maryland (Lyman, 1981). For instance, Sumarsih and Saragih (2012) reported that the strategy has improved students' achievement in writing narrative test for English as a Foreign Language (EFL). While for oral communication skills in EFL classrooms setting, Raba (2017) indicated that the strategy plays a positive role in improving students' oral communicative skills, creating a cooperative learning environment and enhancing students' motivation to learn better. Webb (2009) also reported the same findings while conducting technical communication classes using several active learning techniques including think-pair-share strategy for mechanical and electrical engineering diploma students.

Concerning Student Response System (SRS), often small hand-held device called clicker will be utilized by students. Using the device, student may remotely respond to multiple choices questions that are posed during lecture (Gok, 2011;Matin, 2012). Another cheaper approach is using online based SRS such as Kahoot (Rodrigo et al., 2016) that eliminates the need to give students handheld clickers. Through Kahoot, instructor create online quizzes and mirror the questions on a big screen, students respond to the quiz items on any Internet-connected device, including their smartphones.

Results obtained showed that SRS is often useful for introductory courses and for monitoring peer learning methods in the large lecture classroom because the system can give feedback to both students and instructors on how well the entire class understands concepts presented. Once this feedback is obtained, an instructor can modify the course of instruction, or students can work out misconceptions by peer or classroom discussion (Gok, 2011;Matin, 2012; Rodrigo et al., 2016). Based on the benefits that have been discussed as aforementioned, SRS using think-pair-share strategy was proposed in this work.

APPROACH AND METHOD

Student Response System (SRS) is a client server application that implements think-pair-share strategy – using Smartphone to obtain fast feedback from students and instructor can view the responses in their laptop for in-class measurement and assessment of student understanding. SRS consists of android application installed on students' Smartphone (as clients) with a Wi-Fi connection to the laptop (as server) that belongs to the instructor.

During the teaching and learning process, the instructor will ask the question to the group of students for the purpose of assessing the student information. This is the common summative assessment process to observe the student capability on their understanding. During this stage, the Think Pair and Share process will take place where the student will be given a space to discuss with their peers before choosing the answer. Then, the student will give the response by submitting the answer of such question through their smartphone based on Android application as shown in Figure 1.

Figure 1: Android application installed on students' Smartphone (as clients)

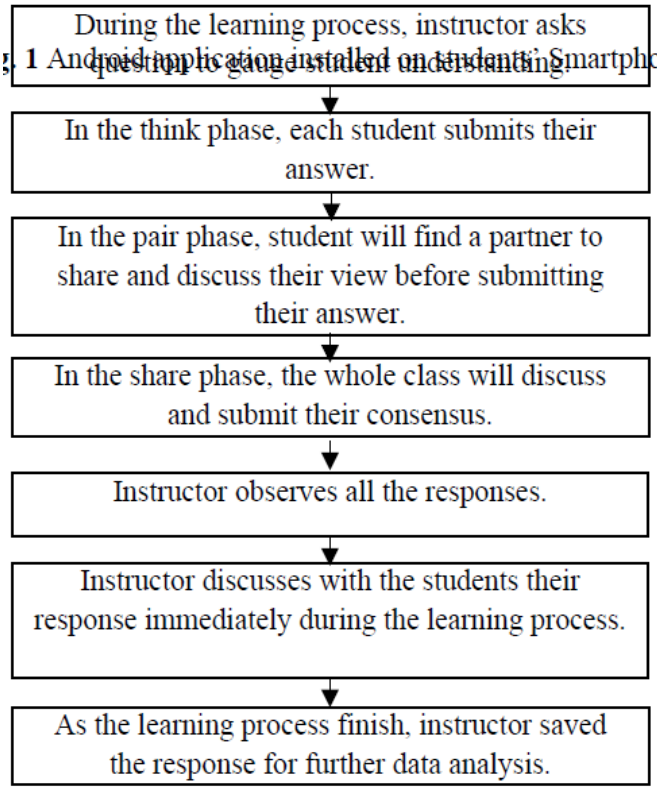

Figure 2: Flowchart of Formative Assessment using think-pair-share strategy

Once the answer has been submitted by the student, the instructor will evaluate the response at the dedicated server. For such server application, the instructor might use any personal computer or laptop as a tool to observe the response. Immediately after receiving the answer from the student, the instructor will discuss with the student regarding the answer. The discussion should be conducted in active learning environment where the student will be asked to give their reason of choosing their preferable answer.

After the learning process is completed, the instructor will save all the students' answer for analyses purpose. The server also has been designed to accommodate the basic analysis tools as shown in Figure 3 and 4. Figure 3 shows the tabulated result from the student answer in term of number of

percentile, while Figure 4 illustrate the tabulated result of the similar group of students in term of bar chart.

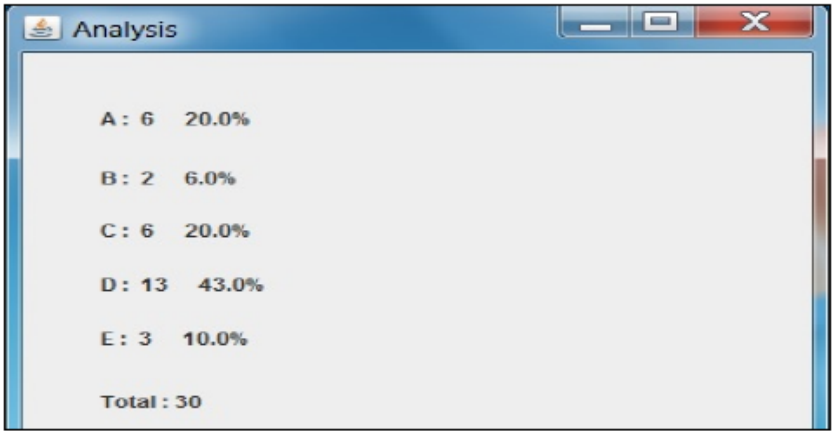

Figure 3: Result from the Students' Answer in Term of Number of Percentile

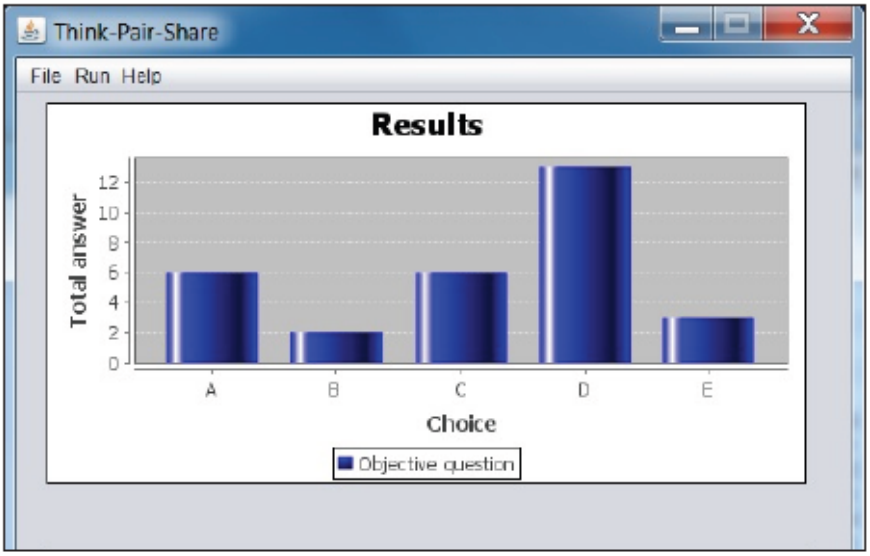

Figure 4: Result of the Similar Group of Student in Term of Bar Chart

RESULT

An assessment was done to evaluate the applicability of integrating SRS with think-pair-share strategy. The assessment was done to a group of semester 6 students studying Operating System subject, an engineering course at Faculty of Electrical Engineering, Universiti Teknologi MARA, ShahAlam. The assessment consisted of 10 questions was posed during lecture. The same set of question was answered by the same group of students which are by individual, by pair, and by sharing with the whole class. The results of the assessment are depicted in Figure 5.

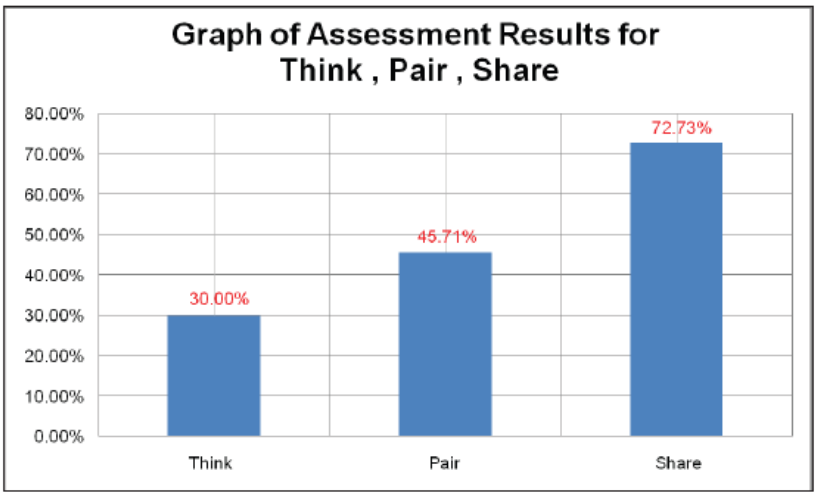

Figure 5: Results of the Assessment

In the think phase, each question was given 120 seconds for the students to think before they can submit their answers. For this individual assessment, about 30% in average were correctly answered by the students. When students were pair up in a team, they were given 5 seconds to discuss the question with their partner and another 120 seconds to answer it. While individual answers managed to score about 30% in average of correct answers, the result working in pair has increased to 45.71% in average. When the whole class discussed and shared their answer, the result increased further to 72.73% in average.

CONCLUSION

The proposed SRS has been introduced to improve student learning outcomes and classroom interactivity. With SRS, students only need to submit their answer using Smartphone which make the process faster and more convenience. Hence, the responses from students will be recorded. The responses can be saved to file for further discussions and analysis on the Teaching and Learning methodologies. Overall, the results indicated the system was able to help both instructor and students. Students may improve their understanding through discussion with their partner and the whole class.

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REFERENCES

Cowie, B. & Bell, B. (1999). *A Model of Formative Assessment in Science Education*. Journal of Assessment in Education: Principles, Policy & Practice, vol. 6, pp. 101-116.

Crooks, T. (2001). *The Validity of Formative Assessments*. Proceedings of the British Educational Research Association Annual Conference. Leeds, United Kingdom.

Demetry, C. (2010). *Work In Progress - An Innovation Merging "Classroom Flip" And Team-Based Learning.* Proceedings of the IEEE Frontiers in Education Conference (FIE 2010), Washington, DC, USA.

Gok, T. (2011). *An Evaluation of Student Response Systems from the Viewpoint of Instructors and Students.* Turkish Online Journal of Educational Technology (TOJET), vol. 10, pp. 67-83.

Lyman, F. (1981). *The Responsive Classroom Discussion*. Mainstreaming Digest: a collection of faculty and student papers, pp. 109-113. College of Education, University of Maryland.

Matin, M. (2012). *Interactive Computer-Centered Instructions for Science and Engineering Education*. Creative Education, vol. 3, pp. 375-379.

Sumarsih&Saragih, Z. S. (2012). *Improving Students' Achievement in Writing Narrative Text through Think-Pair-Share Technique*. TRANSFORM Journal of English Language Teaching and Learning of FBSUNIMED, vol. 1, pp. 1-9.

Raba, A. (2017). *The Influence ofThink-Pair-Share (TPS) on Improving Students' Oral Communication Skills inEFL Classrooms*. Creative Education, vol. 8, pp. 12-23.

Rodrigo, C. P. E., Luiz, R. M., Juliana, R. C., Hector, A. C. G. & Camila, C. T. (2016). *Kahoot, A New And Cheap Way To Get Classroom-Response Instead of Using Clickers*. Proceedings of ASEE's 123rd Annual Conference & Exposition, New Orleans, LA

Webb, D. (2009). *Achieving Excellence in Technical Communication Classes by Using IEEE Spectrum Magazine & Active Learning Techniques*. Proceedings of the IEEE International Professional Communication Conference (IPCC 2009), Waikiki, HI, USA.