ENHANCING STUDENTS' INTEREST AND ACHIEVEMENT IN PROGRAMMING 1 SUBJECT THROUGH PAIR PROGRAMMING

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ABSTRACT

Purpose - Fear of programming subject is very common among Bachelor of Science in Information Technology novice students, since it is one of the most difficult subjects taken by them. Similarly, the lecturers face high challenges in delivering this subject. The students' interest need to be gained so that they will practice programming without giving up. Additionally, the lecturers face high failure rates for this subject. By tradition, lecturers prefer to teach this subject through lecture and lab exercises (Maguire, Maguire, Hyland, & Marshall, 2014). However, in today's learning environment and required skills for the 21st century, this approach is no longer suitable. Collaborative learning has been widely cited in literature as an approach that can provide benefits to the first year programming students (Maguire et al., 2014; Teague & Roe, 2009). Therefore, this study adapted pair programming technique to enable collaborative learning and promote deep learning in programming class.

Pair programming is implemented by having two students working in pairs to solve a problem using one workstation. One of the students become the driver, who controls the input device and type the code. Meanwhile, another student becomes the navigator who is responsible to review the typed code and think for alternative solutions. Both will change their roles frequently (McDowell, Werner, Bullock & Fernald, 2006). Researches has shown that this technique has been applied successfully for programming courses (e.g. Salleh, Mendes, & Grundy, 2011; McDowell, Hanks & Werner, 2003). Similarly, result from the survey and focus group discussion conducted in this study indicates that the pair programming technique is able to increase students' interest in Programming 1 subject. Also, the examination results of the repeaters increased as compared to the previous semester.

Methodology - During the semester, the pair programming technique was implemented in the Programming 1 class. To gather students' feedback, an online survey and focus group discussion were implemented. The instrument for online survey was developed by referring to the existing studies, which contains three sections. Generally, 7-point semantic differential scale ranging from Strongly Disagree to Strongly Agree was used in most of the questions (Zikmund, Babin, Carr & Griffin, 2010). Furthermore, the focus group (Martakis & Daneva, 2013) discussion was conducted by selecting seven students. Their opinion were gathered in more detail through the discussion. Finally, the examination results of the repeaters of the subjects are compared to observe their improvements.

Findings - Thirty five (35) students were involved with the online survey, whereby majority of them were the repeaters of the subject (74%). Most of them stated that their previous lecturer used traditional approach in programming class (68%). Based on the outcomes of online survey and focus group discussion, pair programming is found to have a lot of benefits to the students. They highlighted that this technique is able to enhance their communication skill and helped them to produce better quality of code. On top of that, they agree that this technique helped them in getting solutions correctly and faster by following the proper steps. It increased their interest in programming and enable them to complete java programs more precisely.

Besides that, other stated benefits are enhancement in critical thinking and communication skills, teamwork, problem solving, programming skills and improve their confidence. Enhancing their interest is very critical because when they have interest, then only they will do their best to understand the subject and try to learn more deeply. Otherwise, they will not put full effort for the subject. Additionally, by working in teams, they are able to exchange knowledge as well as improve the quality of code and design. Nevertheless, the students emphasized that to implement pair programming successfully, few important factors need to be considered. Among them are the programming ability and similar motivation among the pairs and their compatibility. This is supported by an existing study (Keefe et al.,2006).

Furthermore, outcome from the pair programming technique implementation can be seen from the students' achievements. The examination results of the repeaters are examined to understand their improvement. Majority of them improved their grades as compared to the previous semester. Four students achieved A or A-. Only few remained with the same grade or lower. This shows that when their interest can be gained, they are able to achieve better results.

Keywords: Pair programming, programming course, interest, achievement.

CONCLUSIONS

In a nutshell, this study has provided an initial evidence on the suitability of collaborative learning approach, specifically the pair programming technique in programming classes. The findings are aligned with the existing studies. The ability of pair programming to promote deep learning can be seen. Thus, this study suggests other lecturers to use the same approach for their programming classes.

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