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Introduction of Programming skills in Peer Tutoring Programme for Engineering Students

Yasothei Suppiah[1], Tan Chun Fui[2], Lim Way Soong[3]

[1]Lecturer, Faculty of Engineering &Technology, Multimedia University, Melaka, Malaysia
[2]Lecturer, Faculty of Engineering &Technology, Multimedia University, Melaka, Malaysia
[3]Associate Professor, Faculty of Engineering &Technology, Multimedia University, Melaka, Malaysia

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Abstract - *The peer tutoring programme is conducted by student volunteers as a supplement to the ongoing lectures and tutorials classes in Faculty of Engineering & Technology, Multimedia University (FET-MMU). In FET-MMU peer tutoring programme, programming skills classes are recently introduced besides the normal subjects. Students who have the capabilities of teaching other students in programming skills are encouraged to join as peer tutors. The feedback from those attended the programme have been studied and analysed. This implementation was found to be very effective and useful to the Engineering students.*

Key Words: (Size 10 & Bold) **Peer Tutoring, FET-MMU, programming skills, MATLAB**, **PSpice**

1. INTRODUCTION

The peer tutoring programme is widely applied in many universities or colleges which involves senior students assisting junior students as academic tutors. Peer-tutoring serves as a programme that supports new students' adjustment, [1] and it can be defined as 'the acquisition of knowledge and skill through active helping and supporting among status equals or matched companions, where both tutees and tutors benefit from the transaction', [2] .

There is no denial of the importance of computer programming skills for engineering students in their early years of their university education, [3] and [4]. The benefits of adapting computer programming in the engineering curriculum has shown to enhance students' skills in logical reasoning, quantitative problem solving and in application of technical knowledge, [5]. Although computing has become an integral part in engineering courses, teaching programming skills have become a pedagogical challenge for many higher learning institutions, [6].

In FET-MMU, the computer programming skills are incorporated into the syllabus for electronics engineering such as ECP 1016 Computer and Program Design and ECP 4206 Object Oriented Programming with C++. It was found that there is a need to emphasize computer programming skills among engineering students as there were many students were lacking the fundamental programming knowledge. This have affected their progress in developing projects and other challenging engineering subjects. Although computer based subjects are being taught in lectures and labs, many students still fail to grasp the foundation of the computer languages and its implementation.

The advantage of peer tutoring programme can be found in many studies such as, [7] and [8]. The success of FET-MMU peer tutoring programme can be observed in [9]. In their paper, they have shown how the model is built and implemented. The effectiveness of the model is reflected in the good performance of students in their examination.

2. Computer programming session in FET-MMU peer tutoring programme

The FET-MMU has been organizing the peer tutoring programme since year 2012 for the engineering students. This programme is introduced where peer tutors teach and coach the junior students on volunteer basis without any payment. Many students have joined this programme and gained motivation towards their studies and their academic achievements can be observed in [9]. Very recently, the FET-MMU peer tutoring programme has taken an additional measure in providing a helping hand to improve the students' academic performance by providing computer skills classes. First, an announcement is posted for the recruitment of peer tutors for the computer programming session at the faculty bulletin board, the FET-MMU peer tutoring website, peer tutoring facebook and at the MMLS (multimedia learning system of MMU). The recruitment of peer tutors is not an easy task as this programme is a voluntary basis conducted by senior students. Besides this, the tutors need to be academically sound in programming, scored good grades in their studies especially the programming subjects and willing to contribute their knowledge and time to coach other students. The selected peer tutors then consult the academicians who teaches computer programming or other complex engineering subjects which requires programming knowledge.

Matlab is a well-known programming software for engineers which has a good modelling capabilities with diverse application. This software is available in our faculty labs which is convenient to handle the programming session. The module or topics covered for the programming session are introduction of matlab, vectors, matrices and basic plotting, logical and relational operations, waveform generation, signal processing and image processing. These topics are essential for the electrical or electronics engineering students.

Besides Matlab, PSpice is a simulation software for circuit. The FET-MMU peer tutoring programme has offered PSpice programme for students who are taking Electronics I subject or yet to take the subject in the following trimester.

Once the module for the computer programming skill is developed, the faculty puts up another advertisement in the faculty portals for students' recruitment to join the peer tutoring session. Only limited seats are offered for the session as the purpose of this program is to help weak students or students who have failed the programming subjects. In this way, students receive more attention and coaching time from their tutors. The tutors could also emphasize and tackle the problem faced by students especially in basic programming skills and the application of various tools in the software.

3. Feedback from the computer programming session

The FET-MMU peer tutoring programme has organised the Matlab computer programming session in the past three trimesters. We observed and analysed the feedback given by students who have attended this Matlab programme. The feedback provided here is based on the last trimester's academic session's survey which is Trimester 1, 2019/2020. There are 15 students who have attended the Matlab programme in Trimester 1, 2019/2020. The students were required to answer the questions based on assessment scales rating from 1 to 5 where 1 denotes very poor, 2 denotes poor, 3 denotes average, 4 denotes good and 5 denotes very good.

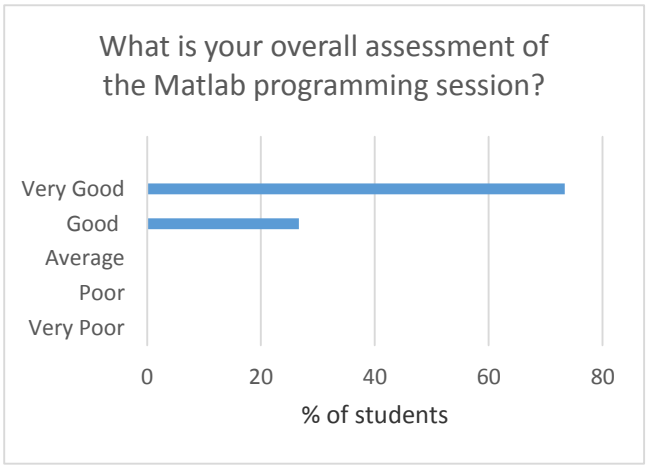

Chart -1: Survey on overall assessment of the Matlab session

From Chart 1, it indicates that about 73% of students evaluate the overall performance of the Matlab session as very good and the rest of them rated is a good.

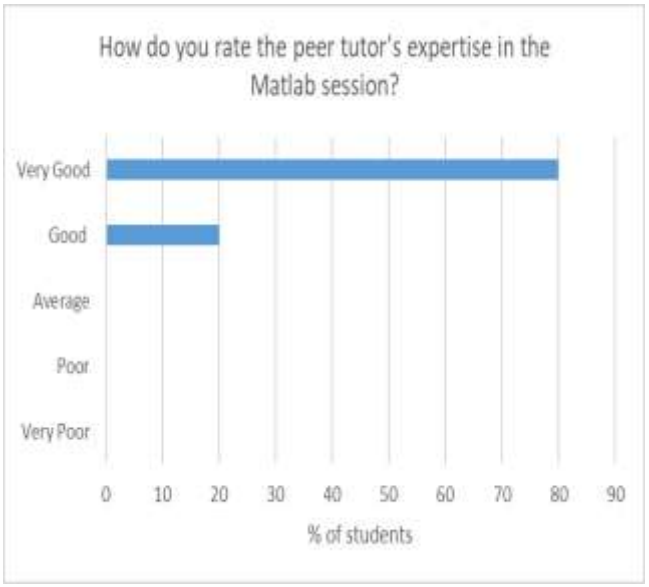

Chart -2: Survey on peer tutor's expertise in Matlab session

Based on Chart 2, 80% of the students found that the peer tutors are very knowledgeable and capable in handling the Matlab session.

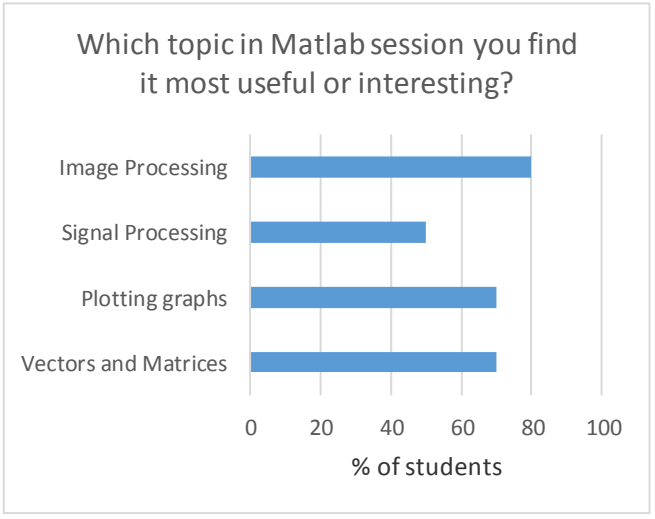

Chart -3: Survey on most useful or interesting topic in Matlab

Chart 3 indicates that most students are interested in the image processing in the Matlab session followed by plotting graphs and vectors and matrices topics. The students are allowed to tick more than one choice for this question.

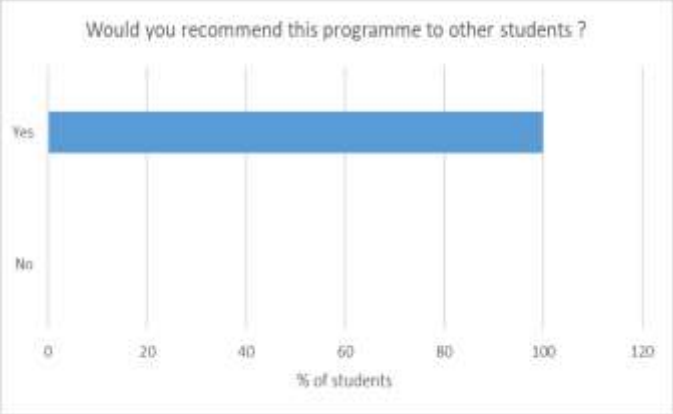

Chart -4: Survey on whether students recommend the Matlab session to other students

Based on Chart 4, all students agreed that this programme will be beneficial to other students as well as they would recommend for others to attend.

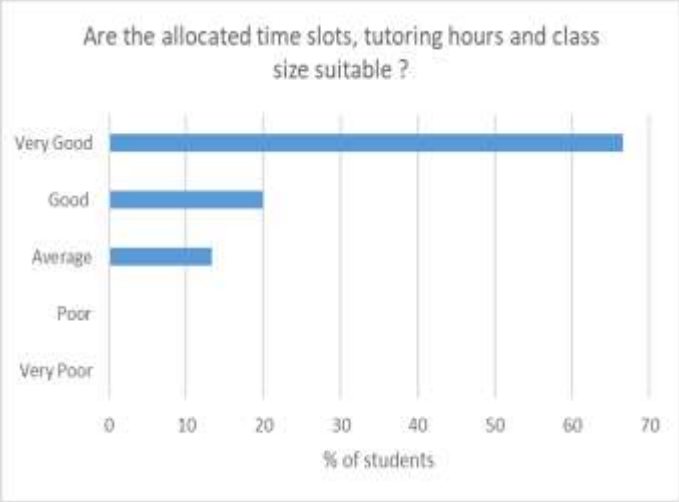

Chart -5: Survey on time slots, tutoring hours and class size

Chart 5 shows that 67% of the students have no issues in of the time slots, tutoring hours and class sizes. The classes are conducted at night to accommodate both the tutors and tutees availability. Some students find it difficult to travel at night to campus due to some transportation constraints.

In general, the students who attended this Matlab program are satisfied with the peer tutors and content of the program. Most of them suggest that this programme should be offered every trimester. The students found that the tutors were very helpful, obliging and attended to every question and doubt during the session. On the other hand, the feedback from PSpice program observed that 21 students attended this program. Almost all of the students find it very helpful and useful in tackling their problems in their assignment projects for the Electronics I subject.

4. CONCLUSIONS

The FET-MMU peer tutoring programme have expanded their tutoring contribution for the engineering students by offering computer programming sessions for students who are weak in the programming skills. The program received good feedback from students as they have benefited and learned so much from the computer programming sessions. The tutors who have contributed their time, knowledge and energy in making this programme a success is commendable. It is a good way of sharing knowledge and more universities and colleges should implement the computer programming classes in their peer tutoring programme.

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