

EFFECT OF STUDENTS' BACKGROUND ON MICROPROCESSOR COURSE PERFORMANCE

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Abstract

Academic performance of higher education students has always been given attention over the years. Numerous approaches have been proposed and implemented to improve academic performance as it reflects the students' comprehension of the lessons taught in university. Realizing the significance of academic achievement, Faculty of Electrical Engineering, UiTM Terengganu had conducted a study of Microprocessor course students' background. Even though Microprocessor is one of the courses which manage to garner highest achievement, the instructors have noticed that there is a decline in students' effort to excel in this course. Therefore, our work selects four criteria which reflect students' background namely: CGPA, previous secondary school, performance and interest in C programming course to study how each background criterion affects the performance. The survey responses which involved 38 students have shown that the students' performance in Microprocessor course is indeed affected by their CGPA, secondary school and grade in C programming course. Their interests in C programming do not leave huge impact on their performance. The findings will be used to take prevention step in the future for improvement of Microprocessor course performance. In consequence, this could contribute to achievement of faculty and university objectives.

Keywords: Engineering education, microprocessor, factor, academic performance, microprocessor, factor

1.0 INTRODUCTION

Microprocessor is one of the final semester courses offered by Faculty of Electrical Engineering, UiTM Terengganu for its diploma students. As this course relies mostly on practical assessment instead of written test, most students have been able to pass the course. However, with the aim to further improve their academic performance, there is a need to identify its determinants. Even though academic achievement is not the ultimate source for life success, it still contributes to employment selection procedures as well as paving the path for career development. Moreover, it reflects the students' understanding and the effort that they put throughout their studies.

In particular with respect to microprocessor course which mostly incorporates technical skills, it is essential to ensure that they succeed in understanding and mastering the lessons for future application when they venture into the real world. In UiTM Terengganu, microprocessor course have always achieved 100% passing rate. However, the initiatives and effort shown by the students have

deteriorated over the years. Therefore, this work aims to identify which background factor that could affect the students' performance. Four background characteristics are selected: CGPA, previous secondary school, performance and interest in C programming course. Therefore, this work has conducted study by obtaining information about the students' background and subsequently exploring the feedbacks with their performance for improvement purpose.

2.0 LITERATURE REVIEW

Numerous studies have been developed to discover factors that affected students' academic performance. One of the researched factors is the students' engagement in class (Gunuc, 2014). The study has reported that student engagement plays major role in determining their average academic performance. Therefore, (Gunuc, 2014) concluded that more researches are required to identify and devise methods to enhance student engagement.

Other studied factors are students' attachment to their parents and influence of peers. (Gemeay, Ahmed, Ahmad, & Al-Mahmoud, 2015) studied these factors and concluded that peer attachment does significantly impact academic performance, however according to the study findings, parent attachment has no effect. Meanwhile, students' prior knowledge factor for academic achievement has been studied by (Ogunleye, Awofala, & Adekoya, 2014). The work specifically researched the impact of students' background knowledge of mathematics on their physics course performance. Nevertheless, based on the study findings, there was no statistically significant difference between the experimental (teaching of prerequisite mathematics concepts in physics before real physics teaching) and control (physics teaching only) groups with regards to their achievement in physics.

Moreover, (House, 2000) measured the effect of student attitudes in terms of achievement expectancies, academic self-concept, financial goals, social goals, desire for recognition, parental education and high school curriculum. The finding of this study was then correlated to the students' cumulative CGPA of their first year majoring in science, engineering, or mathematics field. The correlations conclude that the combination of the studied factors predicted the students' achievement. (Mawardi & Mohamad, 2017) also studied the attitude factor in determining the graduates' academic performances. In addition to attitude, their study also considers another two factors namely the lecturers' teaching method, and social support. Based on their findings, students' attitudes play the most dominant role in affecting their academic performances.

In relation to attitude (Rothman, 2001) focused on absenteeism as it is believed to affect student learning process greatly. The family background in terms of household economy is also considered in the study which involved indigenous school students in South Australia. Even though only the indigeneous students are studied, the results have shown that absence rate and family socioeconomic status does impact students' achievement. On the other hand, family background and schooling policies are studied by (Wößmann, 2005) as possible determinants of excellent educational performance among East Asian students. Psychological aspect with respect to students' personalities was studied by (Chamorro-Premuzic & Furnham, 2003) instead. The results obtained indicate that the inclusion of personality measures in enrollment selection is vital for ensuring academic performance.

While previously mentioned works looked into students' attitude and their family background, (Parker, Summerfeldt, Hogan, & Majeski, 2004) explored about emotional intelligence impact towards academic achievement. The study was conducted on 372 first-year full-time students at a small Ontario university. They were required to complete forms pertaining to Emotional Quotient (EQ) at the beginning of their enrollment. Their academic records were then matched accordingly at the end of the year. However, the findings are not that straightforward as emotional intelligence consists of multiple dimensions. But this did not negate the importance of emotional intelligence in undergoing transition from high school to university.

Most of the reviewed works studied the determinants of academic performance for general subjects which are heavily based on final exam assessment. This work on the other hand, conducted such study for microprocessor course which favours hands-on and laboratory assessments. This paper consists of four sections. Section One defines the importance of academic performance while Section Two highlights the literature and the deficiency that have been addressed. Section Three presents the overview of conducted survey and Section Four explains the results of conducted survey and discusses the findings. The final section summarizes the content of this paper and outlines the research directions in the future.

3.0 METHODOLOGY

Microprocessor system course consists of evaluation in many levels of Bloom's Taxonomy including soft skills, critical thinking, problem solving, technical knowledge and others (Bloom, 1956). The assessment includes mini project assignment which constitutes 30%, another 20% is laboratory portion and the rest belongs to written tests.

In this study, the respondents are comprised of students who have taken the course during June - October 2016 session. In the beginning, the sample size of respondents is more than 50 students in three (3) groups of classes. Due to some unanswered questionnaires, the sample size has been reduced to 38 students. The research phases of this paper are summarized in Figure 1 below:

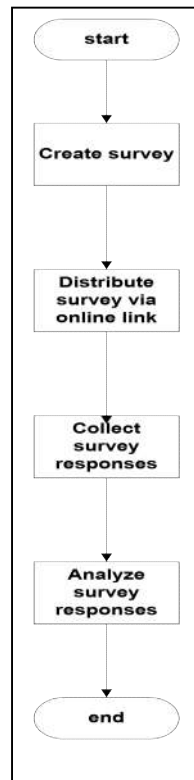


Figure 1 Summary of research phases

From the survey, 94.64% students have answered that electrical engineering programme is their choice compared to only 5.36% stated that electrical engineering is not their choice as shown in Figure 2.

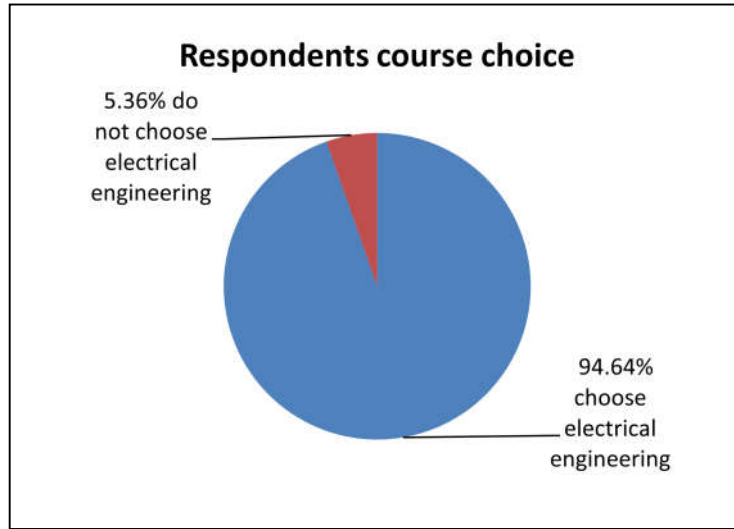


Figure 2 Respondents course choice

Four (4) majoring options are offered namely electronics, communications, computer and instrumentation. As depicted in Figure 3, 44.64% of students chose electronics, 33.9% chose communications, 14.29% opted for computer and 7.14% got into instrumentation.

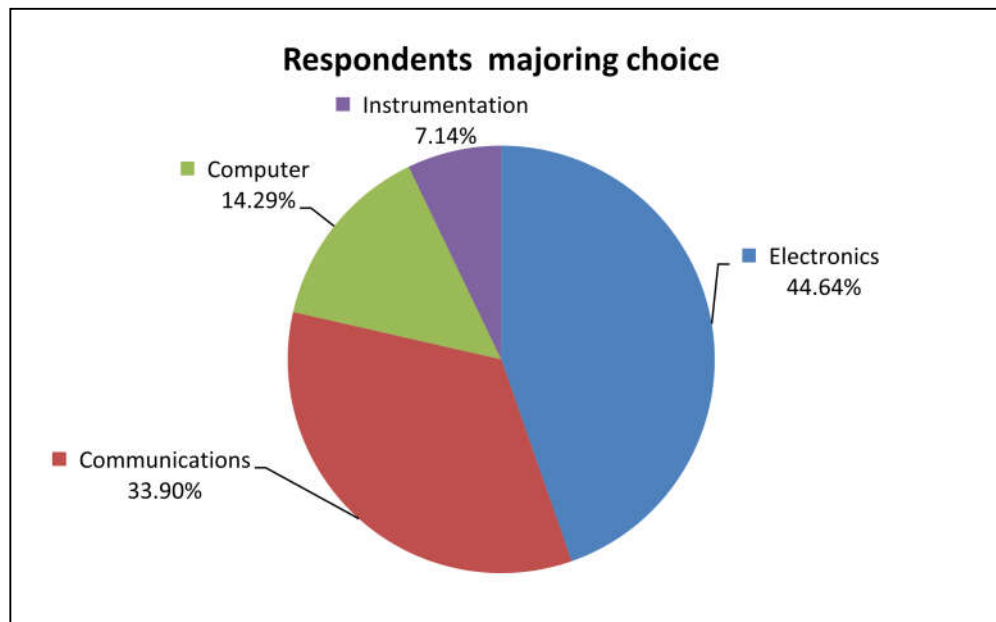


Figure 3 Respondents majoring choice

The questionnaire is designed based on information such as students' academic background which is represented by their CGPA before taking Microprocessor course, their performance in previous related subject and interest in basic programming which is the heart of the course. Every criterion for analysis study will be compared with their grades in microprocessor system course. The former

secondary school is selected for the academic background because in Malaysia, only selected students with good academic achievement are selected into boarding school or MRSM. Meanwhile, the students might be exposed to engineering experience and environment in the technical or vocational schools. However, not all students in government school like SM or SMK are made up of students who did not excel academically. Some of them may refuse to be enrolled in boarding school or MRSM.

C programming course is selected to obtain the students' responses on their performance and interest as this course forms the basis of programming which is essential in Microprocessor course. Although Assembly Language is used instead of C programming language in microprocessor system course, the approaches and assessment methods are almost similar. The only difference is that C programming course is taught at software level, whereas Microprocessor course combines software and hardware implementation. For the Diploma in Electrical Engineering (Electronics) in UiTM, microprocessor system course is the only course that involves programming and hardware together.

4.0 RESULTS AND DISCUSSIONS

This section presents the responses obtained from the survey in form of charts along with explanations and justifications of the findings.

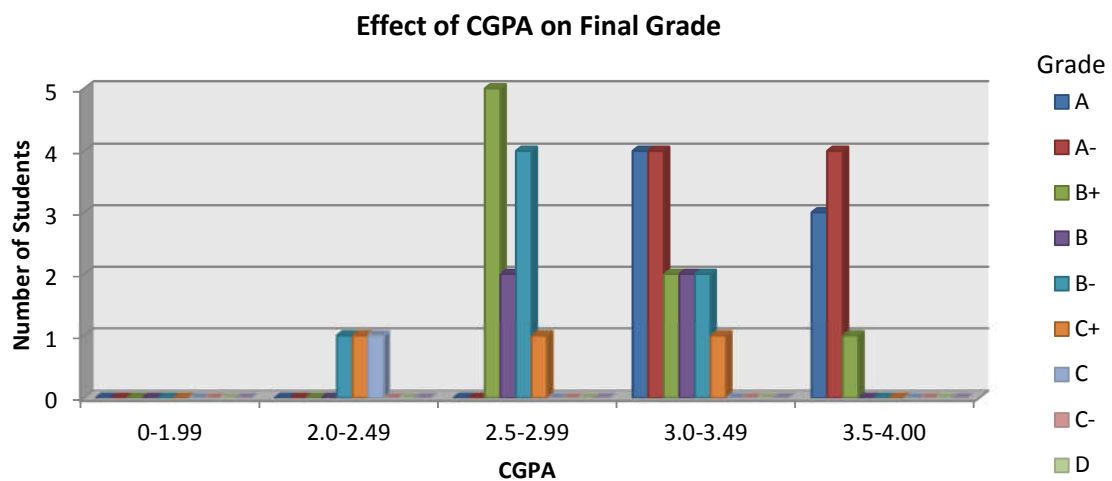


Figure 4 Effect of CGPA on microprocessor final grade

Figure 4 above shows the effect of student's CGPA on microprocessor final grade. It is evident from the graph that 39% with CGPA 3.0 and above score A or A- in microprocessor course. The lowest grade for students with CGPA 3.5-4.00 is B+ while the lowest grade for students with CGPA 3.0-3.49 is C+. On the other hand, 80% of the students with CGPA 2.99 and below obtained B+, B or B- but no student scores above B+. The graph shows that the lowest grade for students with CGPA 2.5-2.99 is only C+ and the lowest grade for students with CGPA 2.0-2.49 is C. The graph summarizes that most of students with higher CGPA obtained better grade than students with lower CGPA. This is because their CGPA are mostly accumulated based on engineering subjects that form the fundamentals of microprocessor. Therefore students with higher CGPA are able to achieve higher grade.

Effect of C Programming Grade on Final Grade

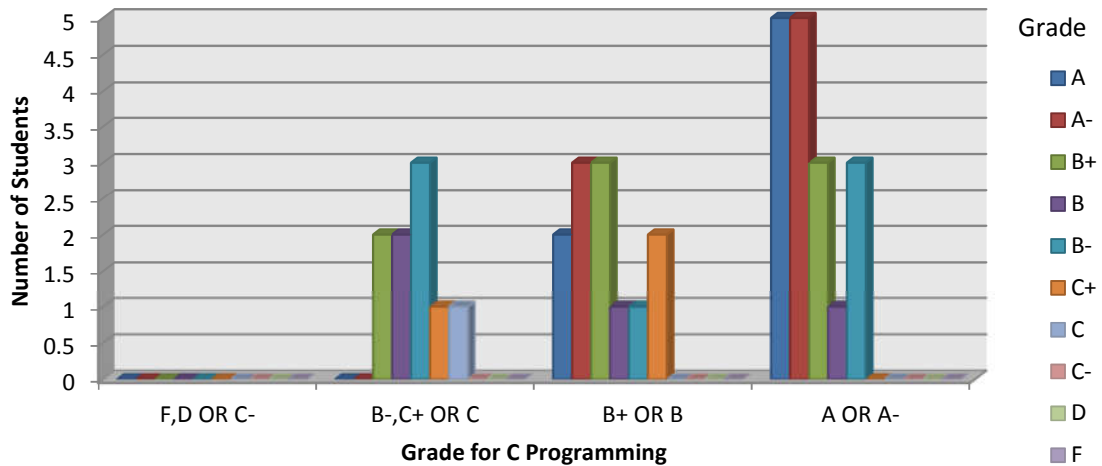


Figure 5 Effect of C programming grade on microprocessor final grade

Figure 5 above illustrates the effect of C programming performance on microprocessor final grade. It is obvious from the graph that most students who obtained A or A- in C programming 26% score A or A- in microprocessor and the lowest grade for this group of students is B-. Furthermore, quite a number of students who obtained B+ or B in C programming 13% also score A or A- in microprocessor. However, more than half of students in this group obtained B+ and below with the lowest grade C+. 78% of students who obtained B-, C+ or C in C programming managed to get B+, B or B- in microprocessor. In conclusion, it appears that students who scores in C programming are likely to score in microprocessor course. This is because programming is one of the important elements in Microprocessor course especially for carrying out mini project task.

Effect of Interest in C Programming on Final Grade

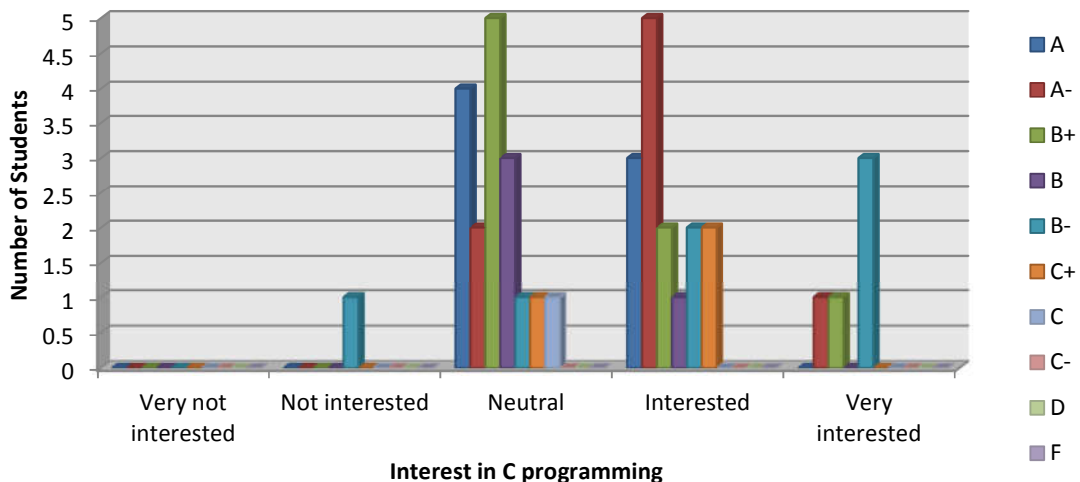


Figure 6 Effect of interest in C programming on microprocessor final grade

Figure 3 shows that there are 39% students who are interested in C programming and 35% students who are neutral in C programming score A or A- in microprocessor. However, only 20% of students who are very interested in C programming achieve A or A- in microprocessor. This concludes that the interest of students in C programming does not determine the good grade in microprocessor course.

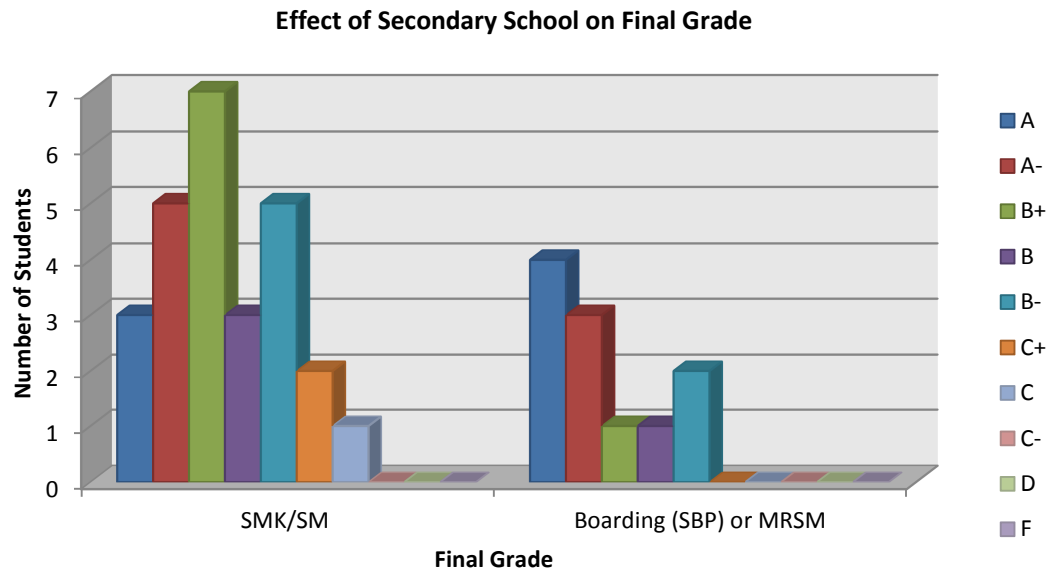


Figure 7 Effect of secondary school on microprocessor final grade

Figure 4 shows that most of students 63% from boarding school or MRSM obtained A or A- in microprocessor course. Meanwhile the students from SMK/SM who obtained A or A- is 31%. It can be seen that the lowest grade for students from boarding school or MRSM is B- but the lowest grade for students from SMK/SM is C. Since the students from boarding school or MRSM are enrolled into their schools based on their academic achievement, this leads to their good performance in microprocessor course as well.

Overall, the survey findings show that the final grade achievement in microprocessor course mainly depends on their previous CGPA which are partly constituted by grade of C programming course. Furthermore, the students from boarding school or MRSM have also contributed to the highest grade achievement in microprocessor course. However, the interest of students in C programming course does not determine the good grade achievement in microprocessor course. This means that the achievement of their academic background reflect their performance in microprocessor course.

5.0 CONCLUSION

This paper has explained the survey conducted on a group of students who took Microprocessor course. The questionnaires require them to provide information of their background: CGPA, secondary school, as well as performance and interest in C programming. Their feedbacks are studied in alignment with their marks. CGPA, secondary school and performance in C programming are found to be the factors that affect their performance in Microprocessor course. However, their interests are not translated into performance. It turned out that previous academic achievement plays huge role in easing them to succeed. With respect to these findings, we plan to revise the teaching and learning process of Microprocessor course. In the future, we would include more factors to be studied and conduct statistical analysis on the responses.

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