Evaluation of Academic Performance of Electrical Engineering Bachelor Degree Students from Various Entry Levels: a Case Study

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Abstract: This paper presents the findings of a research that compares the academic performance of students of the Bachelor of Electrical Engineering Degree program based on the student’s entry levels. In this study, Cumulative Grade Point Average (CGPA) was used as the key performance index. The longitudinal progress was studied based on two consecutive intakes of students in July 2005 and July 2006 from Matriculation. It is interesting to note that there is a correlation between students’ ability at entry level and their academic performance upon graduation, namely their CGPA. It is hoped that the findings can help Program Head, faculty management and stakeholders to decide on entry requirements into the Program. It is also hoped that the findings can help counselors and academic advisors to give proper advice to the students.

Keywords: Academic performance, Ability, entry levels and CGPA.

1.0 Introductions

Faculty of Electrical Engineering has been offering Bachelor of Electrical Engineering (Honors), EE220 since 1996. It is a four year program or eight semesters for intakes from Matriculation. The curriculum is arranged such that students will take up an average of 15 to 18 credit hours per semester. In order to graduate, students will take a total of 137 credits with a minimum score CGPA of 2.00.[1] However students from Diploma can graduate within six semesters or three years, whereby they will be given credit exemption for subjects in semester 1 and 2. Students are allowed to extend additional two semesters to complete their Bachelor Degree program. Beyond that, students will have to pay additional cost according to the number of credit hours taken. There are many factors that contribute to the overall performance of students which include curriculum, teachers and students themselves. This paper focuses on academic performance based on CGPA of students. In fact CGPA is one of the traits sought after by the employers for the first round of interviews, even though other traits like leadership, effective communication skill, interpersonal and entrepreneurial skill will be considered during job interview. Being the Head for a Bachelor Degree Program for a number of years, we noticed that students upon entering into the Degree program were very excited during the welcoming weeks and listened to advices and guidelines. Later on they tend to forget and only refer to Head of Program when they face problems and difficulties along the way. They are socially stable at first but were later unstable under the new social environment. The lecturers and academic advisors must actively advice, give guidance and constantly remind them as to how to go about with University life. It can be very challenging and
definitely different from their previous schooling life.

2.0 Related Works

We studied some past works on this aspect and are described in this section.

N Ali et al [2] found that demography, active learning, student's attendance and involvement in extracurricular activities are positively related to student's performance. H Haron et al [3] showed some of the factors that affect students' performance in their department which include syllabus, lecturers and students themselves. He even discussed teaching approach of Statics and learning difficulties among students in his Department.

N Rajab et al [4] showed that students learn in many ways through their different perception, attitude, responses to specific classroom environment and instructional practices. These factors will also affect the overall performance of students. However students themselves must strategize and be able to adopt and adapt to the University life as quickly as possible so as to maintain the CGPA until they graduate. The above average students (strong ability) with strong credits in Mathematics and Physics can manage well and become high achievers. While the mediocre students just finish with average CGPA and others need additional semesters to graduate. The academic advisors once detect the alarming CGPA can play their roles as early as possible so as to help students to manage their studies, improve study skills, avoid procrastination, nurture self confidence and to acquire positive thinking. [5]

3.0 Methodology

The methodology used in the study is the longitudinal progress of students from different batches. The sample of students was from various Matriculation centers in Malaysia namely Kedah, Melaka, Labuan, Perak, Seremban, Pulau Pinang, Negeri Sembilan, Pahang, Kelantan and Johor.

The first sample of the study was taken from first batch of students from Matriculation intake in July 2005. We noted the last CGPA of the students from matriculation as entry point to university. We also keep track of their CGPA results for every semester until graduation. Then we took the second sample of students from matriculation intake July 2006. We track their performance using the same longitudinal progress based on CGPA.

We focused on the following factors:

i. ability of students at entry point
ii. performance of students at first semester
iii. CGPA follow through
iv. final CGPA correlation with the first semester
v. Factors that influence the academic performance.

4.0 Findings

We found the following observations:

Ninety three (93) students who entered semester 1 consisted of 35 female and 58 male students for Matriculation intake July 2005. Two overseas students were; one (1) female from Mauritius and one (1) male student from Yemen.

Figure 1.0 shows overall students CGPA for all the eight semesters for the first sample batch of students. From this batch of students, first semester result showed that five (5) students were dismissed with CGPA less than 1.6 based on Academic Regulation. [1] It is also shown that eighty one (81) students managed to reach semester 8 and sixty nine (69) or (85.19%) graduated on time while twelve (12) students or (14.8%) extended to graduate. From sixty nine graduated, seven (7) or (8.64%) obtained First class, fifty two (52) or (62.6 %) secured Second upper and eleven (11) or (13.56%) obtained Second lower.

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Then we took a sample of strong ability students and tracked them based on CGPA. Figure 2.0 shows that those students maintained their performance all the way through until graduation. They maintained their performance due to their strong ability and capability.

On the hand, those students with medium ability were unable to complete the entire program within the specified time. A sample of those who extended the Program in order to graduate was analyzed. These students had medium ability in their foundation right from semester 1. Their performance showed that they needed a longer track and slowly but steadily process towards graduating. In fact some strategized to take up longer time so as to maintain steady CGPA. Figure 3.0 shows the longitudinal progress of such students. They did manage to graduate finally with reasonable CGPA.

This type of students needed guidance from their advisors and must be equipped with strong confidence level and determination to finish to the end of Program.

The same longitudinal progress was applied to another sample batch intake namely July 2006. There were one hundred seventy four (174) students entering the system in Semester 1. After one semester, nine (9) students were dismissed based on Academic Regulation. However, one hundred and forty three students (143) managed to reach semester 8. One hundred (100) managed to graduate on time while thirty nine (39) needed further time to graduate. Another four (4) were dismissed due to failure three times in any course registered.

Form total graduates, sixteen or (16 %) secured First Class, fifty eight or (58 %) Second Class Upper and twenty five or (25%) managed Second Class lower.

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Then a sample of strong ability students was followed through from semester 1 till graduation as shown in Figure 5.0.

Figure 5.0

Those students were again very stable in their CGPA right from semester 1 even though their performance varied. On the other hand, the medium ability did not make it within the time allocated. They required extension of at least one more semester to graduate. Figure 6.0 shows such progress.

From those findings, it can be seen that students with strong ability in Mathematics and Physics at entry level were very stable indeed and managed to complete the Degree program within the specified time. The medium ability students needed proper guidance, motivation, advices and effective study skill in order to graduate with reasonable CGPA. They needed extra time to finish the total credit hours required. Their performance tends to vary from one semester to another semester based on the difficulties of the courses registered during the session.

The same approach was applied to a group of Ex-Diploma Intake July 2005. This batch of students in general can graduate within six (6) semesters. However the ability of students will determine whether they can graduate within specified time with reasonable CGPA. Figure 7.0 shows overall performance of such students.

There were one hundred and eighty three (183) students entering into semester 3 of the Degree Program. After one semester, seven (7) were dismissed based on Academic Regulation. One hundred and seventy four (174) students managed to reach semester 8 and one hundred and thirty nine (139) or (79 %) graduated on time while thirty five (35) or 20% extended.

Then a sample of strong ability students was studied based on the longitudinal progress from early semester until graduation. Such students maintained their performance all throughout their university life. Figure 8.0 shows such progress while those with medium ability...
stretched out until semester 9 to complete their study with allocated total credit hours.

![Longitudinal Progress of Strong Ability Students Ex-Diploma Intake July 2006](image)

Figure 8.0

The performance of CGPA varied but it is within acceptable and stable values. They managed to show stability in CGPA from semester 3 till semester 8. On the other hand those with medium ability were not able to perform well and their CGPA showed slow progress and very unstable at times. Figure 9.0 shows such progress.

Those with medium ability from ex-Diploma managed to graduate slowly with reasonable CGPA even though they needed extra time to pull through.

The overall results and findings were compared between two intakes of Matriculation and that of Ex-Diploma as the final CGPA upon graduation.

![Longitudinal Progress of Medium Ability Students of Ex-Diploma Intake July 2006](image)

Figure 9.0

Table 1.0 below shows the comparison of their achievements based on intakes into the Degree Program of Electrical Engineering. From the table we noted that only 6.5% from Ex-Diploma July intake 2006 managed to secure First Class Honors, while 10.14% from Matriculation intake July 2005 and 16.00% from Matriculation intake July 2006. Hence the major determining factor to the performance of the students is strong ability of students in Mathematics and Physics.

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<tbody>
<tr>
<td>First Class</td>
<td>10.14%</td>
<td>16.00%</td>
<td>6.50%</td>
</tr>
<tr>
<td>Second Upper</td>
<td>73.91%</td>
<td>58.00%</td>
<td>54.70%</td>
</tr>
<tr>
<td>Second Lower</td>
<td>15.94%</td>
<td>26.00%</td>
<td>38.80%</td>
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<tr>
<td>Third</td>
<td>0.00%</td>
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5.0 CONCLUSION

This paper has shown that from the findings, students with strong ability in Mathematics and Physics at entry level of the Degree Program is the major factor that contributed to the performance of students in Degree of Electrical Engineering at UiTM. We proved that among the major contributing factor in this study is that students from Matriculation entry requirement (based on Mathematics and Physics) have indeed showed very good performance while those from Diploma (based on overall performance of the Diploma study) performed averagely.

We hope that these findings would help academic advisors, lecturers, Program Coordinators to play active roles to motivate and advice with appropriate methods those with entry based on overall diploma performance. The high achievers should be encouraged to share and enrich those lower achievers.

Our future work will involve applying longitudinal progress to other glaring and
influencing factors that affect performance of students.

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7.0 REFERENCES