

Evaluation of Undergraduate Students in Construction and Project Management Course in Term of Cognitive, Psychomotor & Affective Domain: A Case Study on Civil Engineering Students in UiTM Sarawak, Malaysia

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Abstract: *One of the required courses for Diploma of Civil Engineering students at Universiti Teknologi MARA is Construction and Project Management (UiTM). This course is essential for students to take before involving the construction sector after graduation. The course objectives are to guarantee that students can describe their understanding of engineering management abilities in the construction industry. This research paper is conducted to assess the performance of civil engineering students who study the project and construction management course in UiTM Sarawak. The evaluation has been analyzed based on the previous four (4) semesters which are the results for July 2018, January 2019, July 2019 and January 2020. A total of 231 students had their performance measured in this study. The study's findings showed that, the performance of the students related to psychomotor and affective domains achieved more than 70% since the last four (4) semesters. Meanwhile, the performance in the cognitive domain ranges between 80 - 92% passing rate. This indicates that the performance of civil engineering students is excellent in conducting Microsoft Project and Autocad Software in their project (psychomotor domain). However, the knowledge of the engineering management skills in the construction industry (cognitive domain) needs some improvement as the average achievement on cognitive is just 55% - 60%. The findings of this study also assist lecturers in determining the performance and understanding of civil engineering students enrolled in construction and project management courses.*

Keywords: Performance, construction management, cognitive, psychomotor, affective

1. Introduction

Construction and Project Management course for the third-year engineering students in UiTM Sarawak provides the basic knowledge on the management of construction projects before and during the construction stage. The course will introduce the students to the working environment of the construction industry and the basics of project management concepts. Higher institutions are responsible for developing undergraduate students to adequately prepare future construction managers in the construction industry (Ahmed, 2014). The construction course is designed to ensure students are capable of the task efficiently in the construction industry (Bhattacharjee, 2013).

By the end of the course, students are expected to understand engineering management skills in the construction industry. Furthermore, the objectives of this course are to ensure the students can conduct an investigation related to construction activities with the implementation of good management practices.

These students also will undergo industrial training attachment in their final semester for 18 weeks as required by the Engineering Technology Accreditation Council (ETAC). This body is delegated by the Board of Engineers Malaysia (BEM) for accreditation of engineering technology degrees. This attachment serves as an exposure in engineering practice which provides the first-hand experience in an engineering-practice environment.

In preparing the engineering students for the working environment in the construction industry, an approach was taken in Project and Construction Management course to measure the attainment of the students on the understanding of the engineering management skills in the construction industry. These attainments were assessed through examination (cognitive), project (psychomotor) and assignment (affective).

2. Literature Review

Currently, the demand for construction management among students is on the rise (Jay P. Christofferson, 2006). At the same time, the students in the Diploma of Civil Engineering will be able to demonstrate knowledge or engineering management skills (Ahmed, 2014). Familiarity with all standard engineering technology processes is essential and training at a practical level to a wide variety of approaches is required at a level appropriate to the students (ETAC, 2015). While it is desirable for students to be properly trained for the skills involved, the central aim is to acquire craft skills (psychomotor).

Nowadays, some universities provide classes to help students learn “soft skills,” including emotional intelligence (Crowley, 2001 & Mitchell, 2010). Many of the latest processes and large-scale or costly operations can only be the subject of observation or demonstration, and visits to engineering works may be helpful. It is a critical component of learning (cognitive) in an integrated academic curriculum in most cases. Engineering Technology Accreditation Council (ETAC, 2015). The challenge arises as educators as the institute of higher learning need to prepare engineering graduates for the working environment, where the graduates are expected to know and perform or attain by the time of graduation.

The students are also able to investigate construction activities related to the implementation of good management practices that reflect the programmed outcome statements in the ETAC accreditation standard and Ministry of Higher Education Blueprint 2015-2025 (MOHE Blueprint). The assessment task is either individual or group work. This information is vital to lecturers and the development of project and management courses (Marcel, 2015).

3. Result & Discussion

Performance Based on Grades

Figure 1 shows the percentage of student’s performance based on grade. The findings show that (based on the previous 4 semesters), none of the students failed every semester from July 2018 until January 2020. Grading C and above is a pass. More than 80% of the students achieved grades B+, B, B-, C+ and C. Every semester, around 9% to 15% of the students

achieved excellence in their results (grade A-, A and A+). These results indicate that 100% of the students completed a passing grade, which is a grade C and above.

The highest performance of the students is indicated in the July 2019 examination in which 15.4% of students achieved grades A+, A and A- (14 out of 91 students). For the examination in January 2019, only 9.1% of students achieved excellence in their examination.

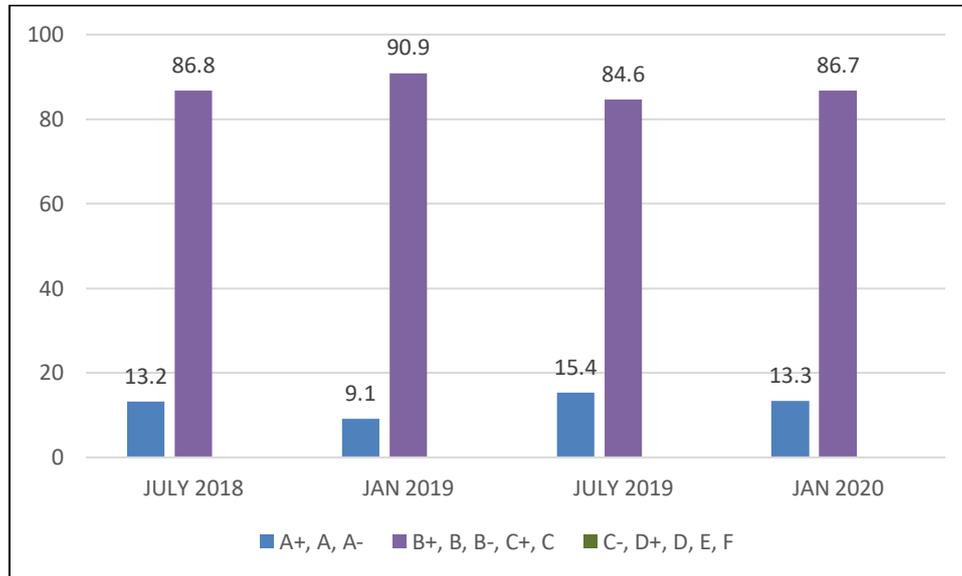


Figure 1: Performance of Construction & Project Management course based on grade (%)

Attainment Based on Grades (2018 – 2020)

Table 1 shows that the number of students based on grade from July 2018 till January 2020. Figure 2 shows the overall performance of the Project and Construction Management course based on the previous three semesters (examination July 2018, January 2019, July 2019 and January 2020). The results show that none of the students failed this course. This indicated that, 100% of Diploma of Civil Engineering students understand the basic knowledge of the engineering management skills in the construction industry. Based on the previous three semesters examination, 13.9% of students attained grades A-, A and A+ (excellent in their result). Meanwhile, 86.1% of students achieved a satisfactory level (grade C and above).

Table 1: Number of students based on grades

SESSION	NUMBER OF STUDENTS (GRADE)			TOTAL
	A+, A, A-	B+, B, B-, C+, C	C-, D+, D, E, F	
JULY 2018	15	99	0	114
JANUARY 2019	1	10	0	11
JULY 2019	14	77	0	91
JANUARY 2020	2	13	0	15
TOTAL	32	199	0	231

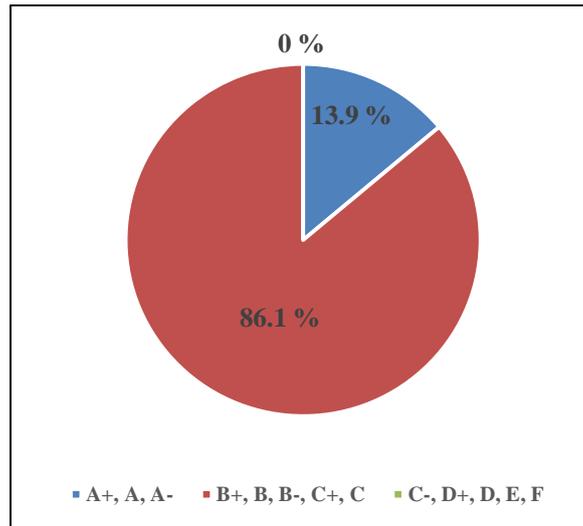


Figure 2: Overall performance of the course based on grades (%)

Evaluation on Main Domain (Cognitive, Psychomotor & Affective)

Project and Construction Management course has three (3) outcomes that need to be attained by every student. These outcomes are measured in terms of cognitive, psychomotor and affective domains. The cognitive, psychomotor and affective are measured in examination, project and presentation, respectively. The assessments of the course are 40% to be evaluated for both exam (cognitive) and project (psychomotor) and another 20% to be evaluated in presentation (affective).

The average achievement in cognitive, psychomotor and affective domains is shown in Figure 3. In terms of cognitive performance, more than 55% of students achieved in terms of cognitive performance based on the previous four (4) semesters (July 2018, January 2019, July 2019 and January 2020). In terms of cognitive level, 60% had the highest achievement in July 2019. This indicates that most of the students can justify knowledge of engineering management skills in the construction industry.

The figure shows that more than 70% of the average achievement is in the psychomotor domain. This indicates that most of the students of Diploma in Civil Engineering can construct investigations related to construction activities with the implementation of good management practices. This psychomotor domain is assessed in project assessment which includes the evaluation of the performance of the students in Microsoft Project and AutoCad.

In terms of the affective domain, the average achievements are 71.9%, 76%, 73% and 77% in July 2018, January 2019, July 2019 and January 2020 respectively. Most of the students are able to demonstrate knowledge or engineering management skills in tasks related to construction. This domain is evaluated in presentation or individual assignments.

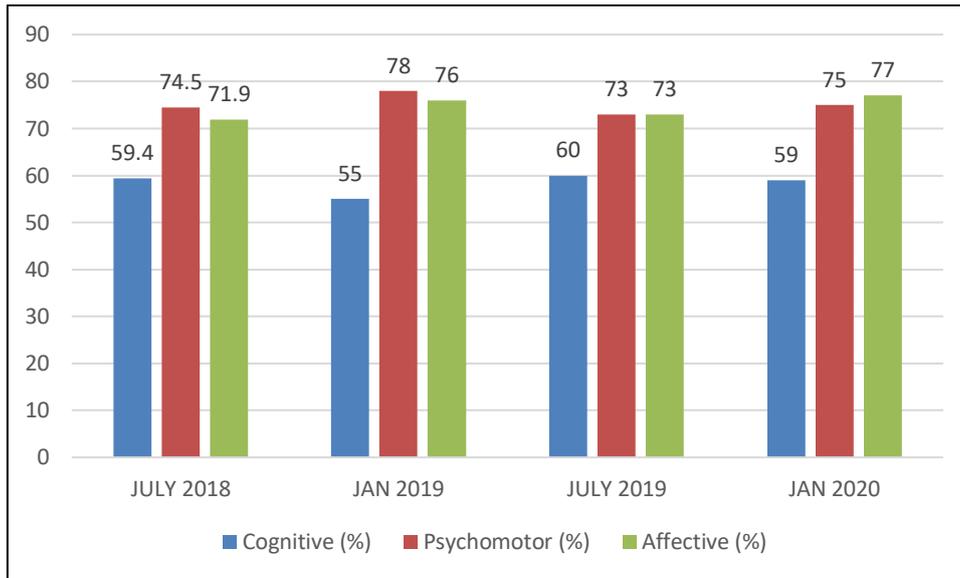


Figure 3: The average achievement on Cognitive, Psychomotor & Affective (%)

Percentage Passes on Main Domain (Cognitive, Psychomotor & Affective)

Figure 4 shows the percentage passes on cognitive, psychomotor and affective based on the previous four (4) semesters. The findings show that the percentage passes on affective and psychomotor domains achieved 100% every semester. All students were achieved more than 50% of each affective and psychomotor domain. This indicated that the students be able to apply Microsoft Project and Auto Cad in the project assessment.

The results show that the student's performance in terms of the cognitive domain is at an excellent level. Cognitive domain measured in examination assessment. The finding shows that the pass percentage every semester achieved is more than 80%. The highest performance was in July 2019, 92% of the students achieved more than 50% (pass). Meanwhile, January 2020 was the lowest achievement 80%. This shows that the students of Diploma in Civil Engineering are able to justify knowledge of the engineering management skills in the construction industry.



Figure 4: The percentage of passes on Cognitive, Psychomotor & Affective

4. Conclusion

Generally, students of Diploma in Civil Engineering, UiTM Sarawak in project and management course in terms of the psychomotor and affective domain are considered excellent. The average performance for both domains were achieved 70% and above from July 2018 until January 2020. It can be concluded that the civil engineering students are able to conduct an investigation related to construction activities with the implementation of good management practices during construction. Furthermore, the students are good in demonstrating knowledge or project management skills.

However, the average achievement in the cognitive domain shows a satisfactory score of 55% percent to 60%, indicating that knowledge of engineering management abilities in the construction sector needs to be improved. Meanwhile, the percentage of passes in the cognitive area ranged from 80% to 92%. The outcomes from this study also give some information to the lecturers in identifying the performance and knowledge of the civil engineering students in project and management course.

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