Work-Based Learning: Final Year Project Outcomes in Bachelor of Technology Programme at Universiti Teknikal Malaysia Melaka

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ABSTRACT

Work Based Learning(WBL) is basically a way of learning that combined theoretical teaching at institution and skill development at industry to produce graduate at optimum level of competency when entering the working environment. This paper describes the implementation of Final Year Project as one element in WBL for first cohort Bachelor of Technology in Electrical Maintenance System with Honors' students under Department of Technology, Faculty of Electrical Technology and Engineering, University Teknikal Malaysia Melaka. It consists of Final Year Project 1 and Final Year Project 2. Every element of assessment form three significant personnel namely Faculty academic staff, Faculty panel and Industrial coach will be explained. Finally, the paper show the output of student performance and analyzed the element that should be focus on for the future student intake.

Keywords: Work Based Learning (WBL), Final Year Project, performance.

INTRODUCTION

One of the most recent educational innovations in Malaysia is work-based learning, or WBL. According to Seagraves et al. (1996)[1], WBL links all areas of work, work-based learning, learning at the workplace and learning through working. Even WBL is one of the learning strategies that has been used for many years in various parts of the world. It is based on the constructivist theory, which describes learning as dynamic and active that happens gradually throughout the course of a person's life (Wilson et al. 1997)[2]. WBL is appropriate to be used in technical and vocational education as well as higher education studies (Stone, 1994)[3].

The term WBL refers to an educational institution's curriculum that combines working organizations and universities to provide new learning opportunities in the workplace (Lemanski et al. 2011)[4]. Becker (2007)[5] stated that WBL is a work experience learning model where students must complete the institution's educational program, obtain experience, and apply industry-related skills to everything that they may require for real-world employment.

WBL is a cutting-edge approach to delivering education. This strategy calls for collaboration between the linked industry and the educational sector. This collaboration considers all the crucial elements of an educational system, including the creation of curricula, the delivery of instruction, evaluation, and closing the loop. According to the Oregon Work Based Learning Manual: An Educator's Guide (1998)[6], this method is in line with internationally recognized practice since it offers students a "process which allows students to meet academic standards in a hands-on, real-life environment while also developing employability skills and career awareness." Additionally, WBL is a learning strategy that provides students with excellent experiences and expands their opportunities since they are immersing themselves in the business they are robbing, according to Ariffin & Ani Asmah (2009)[7].

As WBL is another educational program that leverages the workplace as a learning environment, by applying principles acquired in the classroom to real-world situations, this method helps to close the growing gap

between education and the workforce. It contains a formal teaching and learning plan that is directly related to the work-based learning activities that students do, which are geared toward achieving their professional goals. The WBL approach is a learning process that also includes work experience. Students must complete the program at the institution, obtain experience, and use their abilities in the workplace to be prepared for what is required in the actual world of work.

WBL as the outcome of gaining knowledge and skills from work experience, specifically designed to enhance both intellectual growth and career advancement. This work experience is enriched by various related activities, consolidation efforts, or learning processes throughout the educational journey. This approach contributes to the development of attitudes, knowledge, skills, and habits that are difficult to cultivate solely through work experience. WBL should be viewed as a strategic connection between classroom learning and real-world workplace experiences, where this integration allows students to develop essential knowledge, skills, and attitudes towards employment, leading to more informed career decisions.

Among the benefits of WBL are it provides sufficient timeframe for the industry to train student as it is a good way to test a potential new recruit which will lead to a cost effective solution to an organization's recruitment needs, meet skills shortages and able to grow the organization's workforce, reduce future recruiting/training/cost for new employees and Final Year Project implementation and Industrial Training provide the opportunities for the trainee to assist industry in solving their problem and also student will acquire proper guidance from academic tutor in helping them to coming out with solution

WBL Model

To guarantee the viability of WBL, all parties including educational institution, companies and community must mutually commit to the execution of this strategy. All parties need to think WBL as a two-way bridge between classroom and the workplace to develop the potential of student career path.

Arizona Work-Based Learning Resource Guide Model

In 2003, Lynne [8] identified a model to implement WBL as shown in Figure 1. The model emphasizes the need for cooperation and bilateral connections between educational institutions and industry stakeholders involved in various activities and resources. However, the specific activities and resources involved in this model are not explicitly outlined. This finding is supported by Otala (1994) [9], who suggested that fostering a bilateral relationship between educational institutions and the industry could enhance the efficiency of the WBL method.

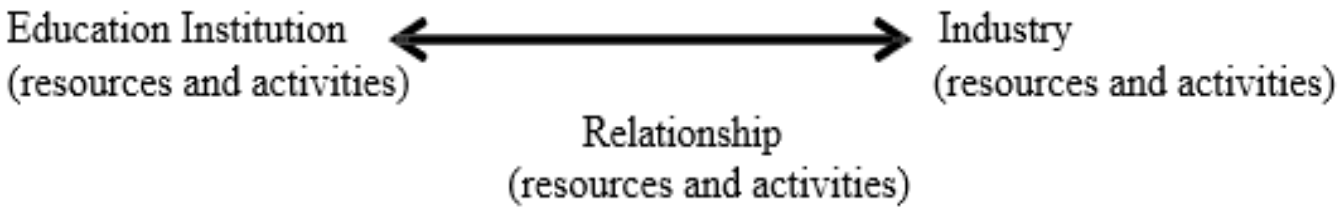

Figure 1: The WBL-Arizona Work-Based Learning Resource Guide Model

Technical Institution and Industry Relation Model

Council of Ontario University, 1998[10] demonstrate the relationship between the industry and the technical and vocational education institution system. Institutions are the source of workers in the various fields of employment, and the employer has the chance to assess the activity involved. Figure 2 shows the relationship between the institution's system and the industry that produces enough graduates and workers who possess the knowledge and skills needed by the current industry. Institution is a place to put a certain skill and responsible to produce manpower according to its curriculum. Hence, the role of the industry in line to produce a good workers cannot be denied. The quality of the technical graduates produces by the institute must fulfil the

criteria and demands of the industry. The industry would get to gain if the education implemented by the institution is in line with technological developments.

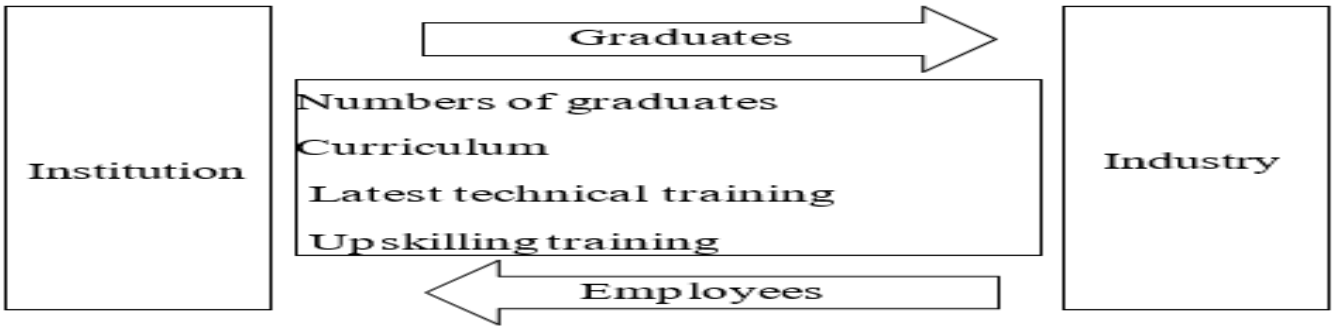

Figure 2 Technical Institution and Industry Relation Model

Edmunds' Model

WBL is for the most part seen as a triangle between students, institution and industry in term of connecting training (student-industry relationship), education (student- institution relationship) and knowledge codification (industry- institution relationship). Figure 3 show the Edmunds' Model which linking three parties to make WBL successfully executed. It emphasis the institution and industry to work together by codifying the knowledge relevant to the need of work content (Edmunds,2007) [11]. It proposed an active participation of the student, industry and institution to a dynamic curriculum for the optimum student potential.

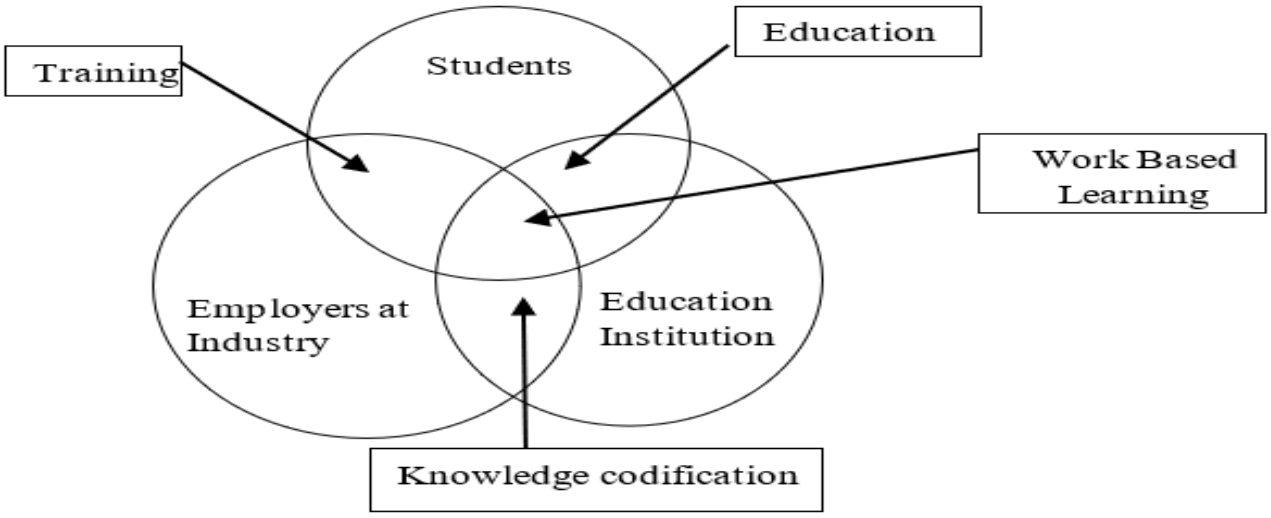

Figure 3: Edmunds' model

WBL IMPLEMENTATION AT FTKE

First cohort of students undergo WBL was under Department of Technology in Bachelor of Technology in Electrical Maintenance System program. It consists of 21 students with 18 students are Malay, 1 student was Chinese, 1 is Kedayan and 1 is Melanau. 15 of them are Male and the rest 6 students are Female. All of them have Diploma Vokasional Malaysia (DVM) from various Kolej Vokasional in Malaysia. WBL for this first cohort of students started from 13th March 2023 to 8th March 2024. It is a duration of 52 weeks consists of semester 6(20 weeks), semester 7(24 weeks) and short semester between semester 6 and 7(8 weeks). Distribution of company placement shown in Figure 4. Most of them doing WBL in Melaka. During these 52 weeks of WBL, students need register two 4 credit hours' subjects along with do 4 credit hours of Final Year Project I (FYP 1) in semester 6, 6 credit hours of Final Year Project 2 (FYP 2) in short semester and 12 credit hours of Industrial Training in semester 7. Method of delivery of the courses are hybrid teaching and learning approaches with rubric based assessment for the 2 subjects, industrial and problem-based project for Final Year Project 1 and 2 and real working exposure for Industrial training. Among the important personnel

involved in WBL are student, faculty academic staff who's going to supervise and evaluate the student, faculty panel who's going to evaluate part of student work and industrial coach who's going to supervise the performance of student at work.

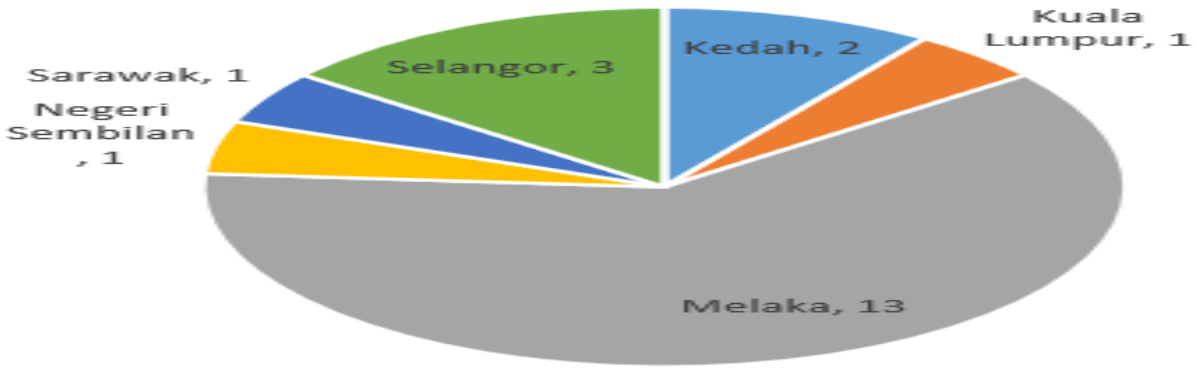

Figure 4: Company distribution of student's placement

Final Year Project 1(FYP 1) Implementation in WBL at FTKE

This is the first part of the Final Year Project. This course is for fulfil students with knowledge in conducting project methods, particularly in the field of technical and vocational education in Malaysia. The student needs to plan and implement the project individually that related to the respective industrial technology field. The student should propose a project and submit the written project proposal. At the end of this course, the student should write a report that covers introduction, problem statement, project objectives and scopes, technical literature review, project methodology, preliminary result and conclusion. The student needs to achieve the objective of the project and presented it in the report. Three Learning Outcomes from this implementation are Evaluate issues or problems in industrial technology and propose solutions, organizes work activity and proposal for the implementation of Final Year Project and presents ideas related to project to evaluators in more systematic. Assessment mark distribution are Project Proposal, PP1SV(10%), Final Year Project I Report, FYPR1SV (15%) and General Conduct, GC1SV (5%) by faculty academic staff. Online Presentation, OP1P (5%), and Final Year Project I Report, FYPR1P (15%) by faculty panel. Project Organization, PO1IC (40%) and General Conduct, GC1IC (10%) by industrial coach. Proposal is assess in term of Title, Project Background, Problem Statement, Objectives and Scope. Final Year Project I Report is assess in term of Abstract, Introduction, Problem Statement, Objectives, Scope, Technical Review, Methodology, Preliminary Results, Citation and References, Language and formatting and Conclusion. General Conduct is assess in term of Identifying Problem, Application, Decision Making and Attitude, Commitment and Discipline. Online Presentation is assess in term of Speech Delivery, Confidence, Understand and respond to questions and Organization and Presentation Skills. Project Organization is assess in term of Identification of Problem, Technical Review, Project Methodology, Preliminary Results, Project Planning and Project Execution.

Final Year Project 2(FYP 2) Implementation in WBL at FTKE

This is the second part of the Final Year Project. Students are expected to continue the project performed in Final Year Project 1 until completion. At the end of the semester, students are required to submit the project report and present their projects for assessment. Three Learning Outcomes from this implementation are analyze data to produce meaningful form using relevant tools, perform project implementation systematically and present the results in the oral and written forms effectively. Assessment mark distribution are Final Year Project 2 Report, FYPR2SV (20%) and General Conduct, GC2SV (5%) by faculty academic staff. Online Presentation, OP2P (5%) and Final Year Project 2 Report, FYPR2P (20%) by faculty panel. Project Implementation, PI2IC (40%) and General Conduct, GC2IC (10%) by industrial coach. General Conduct and online presentation was assessed in the same way in Final Year Project I (FYP 1). For Final Year Project 2 Report, assessment is in term of Abstract, Introduction, Problem Statement, Objective, Scope, Technical Review, Methodology, Results, Analysis of results, Conclusion, Recommendation, Project Potential, Citation and References and Language and formatting. Project Implementation is assess in term of Project Planning,

Project Execution, Result and Analysis, Project Accomplishment, Project Functionality and Project Implementation.

RESULT AND ANALYSIS

Figure 5 and Figure 6 showed the average mark and the percentage of the average mark to the full mark for every element that being assess of Final Year Project 1. For project proposal, student need to submit proposal consist of introduction, scope, objectives, problem statement, methodology, preliminary result and conclusion in week 10 of semester 6. It being evaluate by faculty academic staff. Average mark is 8.24 over 10 which is 82.38%. For Final Year Project Report 1, it being evaluate by faculty academic staff and faculty panel. Result showed faculty panel giving slightly higher mark than faculty academic staff by 0.36 or 2.4%. Meaning that the evaluation done was reliable. Online presentation assesses by faculty panel showed an average mark of 4.21 or 84.13%. Another element that being assess by two parties is general conduct. Analysis showed a significant different where Industrial Coach give average 8.29 mark over 10 whereby faculty academic staff gives only 4.32. The different of 3.97 mark or 2.86%. The reasons maybe Industrial Coach have the privilege of working closely with student. The highest score distribution for Final Year Project 1 is Project Organization which is 40% by Industrial Coach. The average mark given was 33.88 correspond to 84.69%. At the end, 90% of the cohort get excellent result where 15 students get grade A and 4 student get A-. Remaining 2 students get B+ and B- respectively as shown in Figure 7.

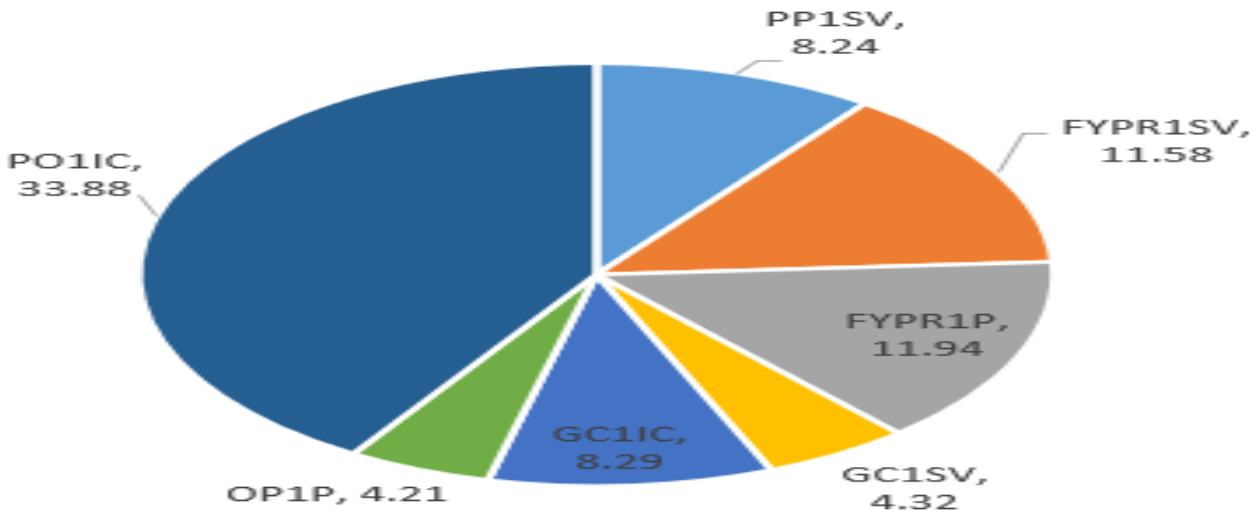

Figure 5: Average mark distribution for FYP1

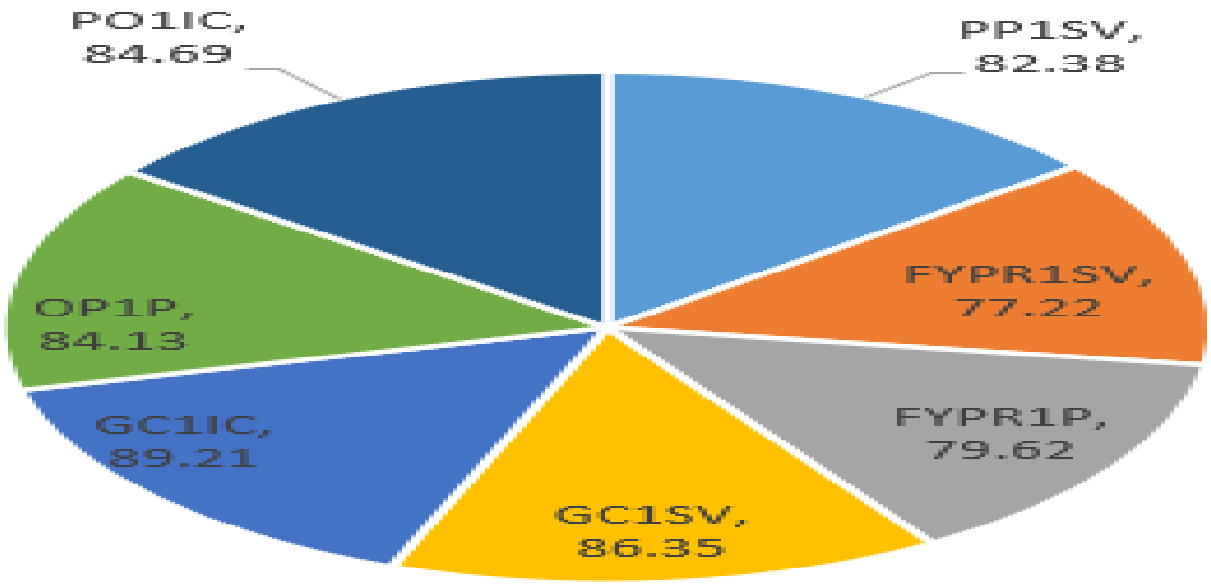

Figure 6: Average mark distribution in % for FYP1

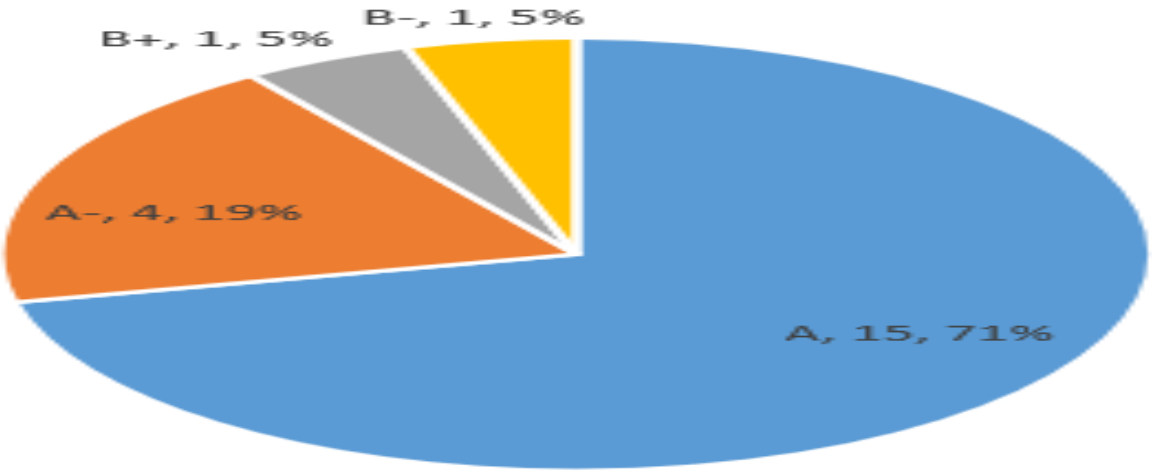

Figure 7: Students Grade distribution for FYP1

For Final Year Project 2, average mark result showed in Figure 8 and Figure 9. For Final Year Project Report 2, likewise FYP1, it being evaluate by faculty academic staff and faculty panel. The same pattern can be seen as result showed faculty panel giving higher mark than faculty academic staff by 1.32 or 6.61%. Higher compare to FYP1. Online presentation assesses by faculty panel showed an average mark of 4.03 or 80.56%. For general conduct, it also showed the same pattern with higher difference. Analysis showed a significant different where Industrial Coach give average 9.56 mark whereby faculty academic staff gives only 4.33. The different of 5.23 mark or 8.89%. The highest score distribution for Final Year Project 2 is Project Implementation which is 40% by Industrial Coach. The average mark given was 37.85 correspond to 94.63%. With higher pattern of average mark, 95% of the cohort get excellent result where 20 students get grade A and 1 students get B as shown in Figure 10.

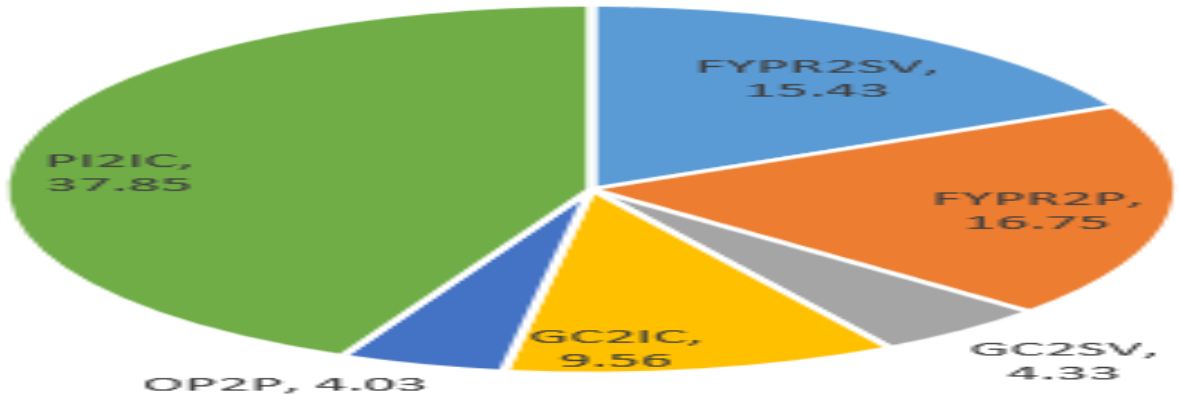

Figure 8: Average mark distribution for FYP2

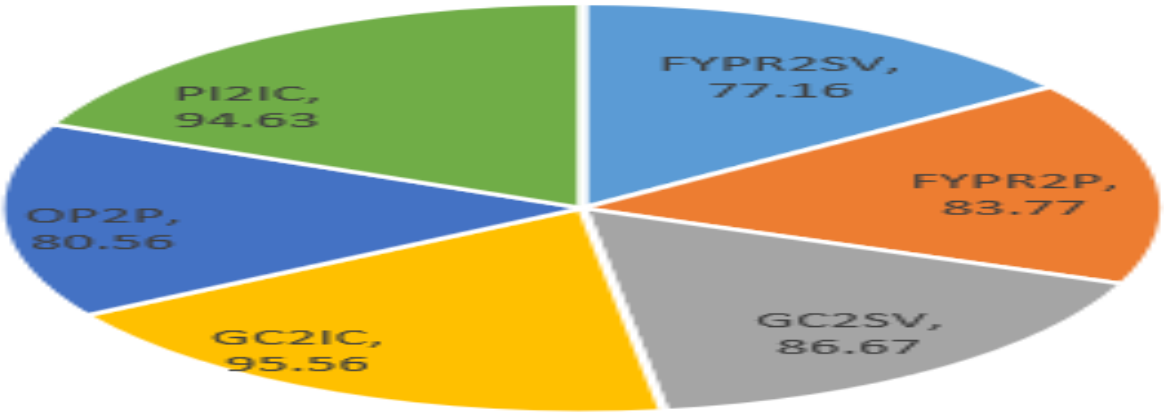

Figure 9: Average mark distribution in % for FYP2

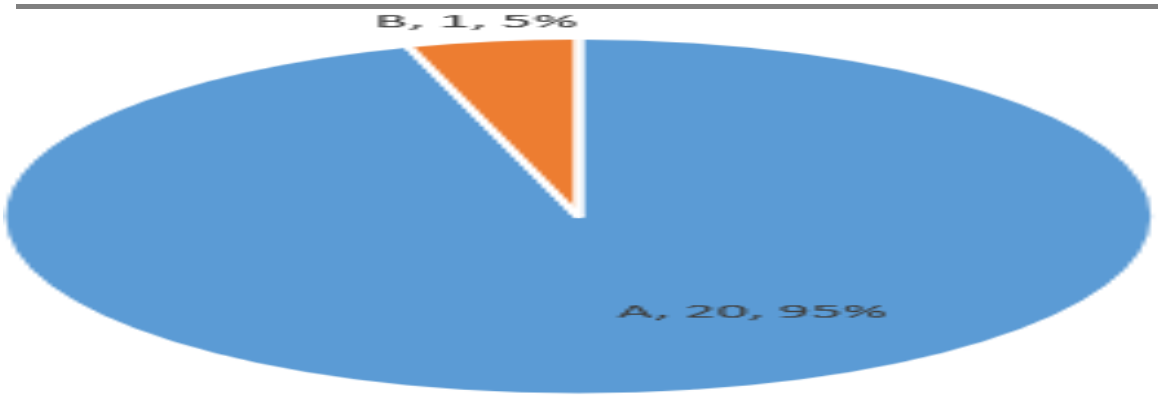

Figure 10: Students Grade distribution for FYP2

Referring to analysis done within FYP1 and FYP2, the lowest average mark given was on Final Year Project Report 1 which was 11.58 mark over 15 or 77.22% and Final Year Project Report 2 which was 15.43 mark over 20 or 77.16%. Both is given by faculty academic staff. Further analysis showed in Figure 11 and 12. For on Final Year Project Report 1, the lowest average mark was on 2.1 mark over 3 of Conclusion meanwhile for on Final Year Project Report 2 was 1.76 over 3 marks for Project Potential. For improvement, focus on this matter should be made for the next cohort of students.

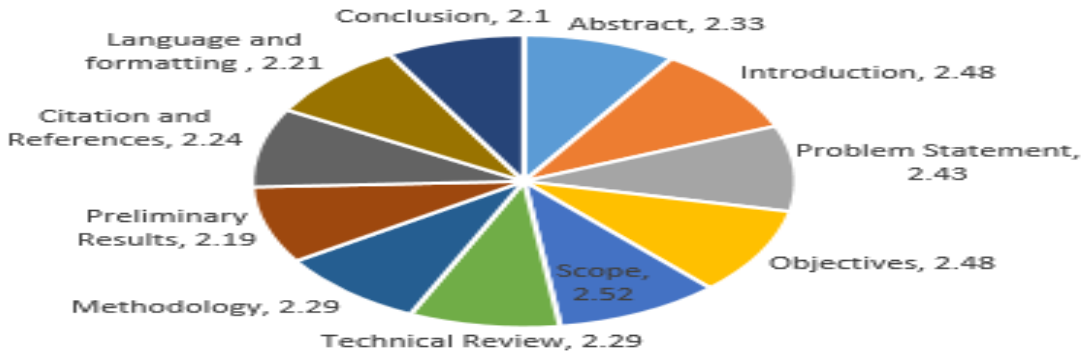

Figure 11: Average mark distribution for Final Year Project Report 1 by Faculty Academic Staff

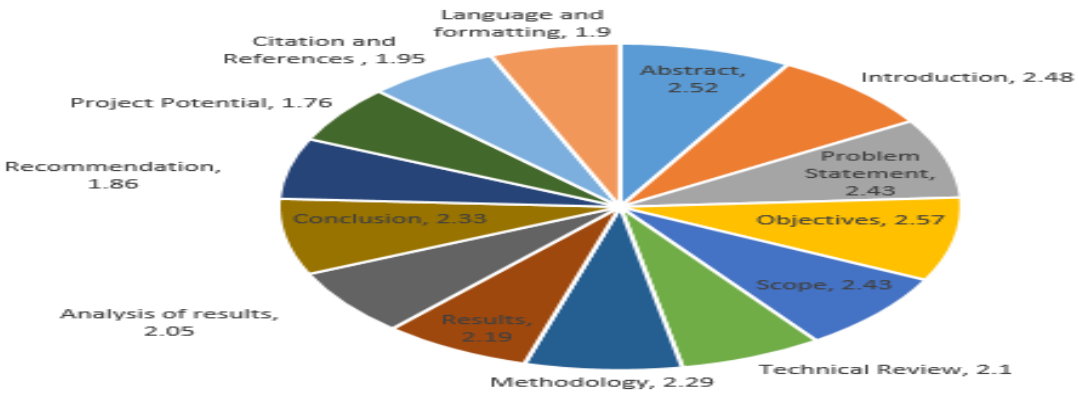

Figure 12: Average mark distribution for Final Year Project Report 2 by Faculty Academic Staff

CONCLUSION

As a conclusion, the mark distribution for Final Year Project 1 and 2 is balanced between institution and industry. 50% comes from both parties with several assessment elements. For Final Year Project 1, average mark for every element was acceptable with the highest percentage number with 89.21% was General Conduct asses by Industrial Coach. Same goes with Final Year Project 2 with higher percentage of 95.56%. It is anticipated as Industrial Coach was the person who work very close with the student at the workplace. For the

lowest number, both part also showing the same trend with Final Year Project Report 1 and 2 assess by Faculty academic staff marked 77.22% and 77.16% respectively. By breaking down the details, Final Year Project 1 showed the lowest mark come from Conclusion of 2.1 mark over 3 and Project Potential as 1.76 mark. Overall, students' performance on both subject are good with for Final Year Project 1, 90% from the class get grade A and A- meanwhile the number even higher for Final Year Project 2 with 95% get A grade.

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