The Effectiveness of Diploma in Information Technology (Digital Technology) Program 2.5 Years at Polytechnic Malaysia

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ABSTRACT

Diploma in Information Technology (Digital Technology (DDT)) program is a new program that has been introduced in Polytechnics that offers information technology programs under the Department of Information & Communication Technology (JTMK). This program offered in 4 Polytechnic Malaysia using a 2.5 years mode for student preparation in education and training especially in computer science. Through this program, students are offered courses covering a variety of tracks that support the latest industries such as Application and Software Development, Networking Systems, Game Technology and Information Security. The purpose of this study was to identify the effectiveness of the Diploma in Information Technology (Digital Technology (DDT)) program based on the average student achievement according to the analysis of the Program Learning Outcomes Review Report (PLORR) for the DDT student June 2016 - June 2018 cohort (1st cohort) using 2.5 years mode. A total of 163 respondents from 4 Malaysian Polytechnics responded to the questionnaire which was distributed online to support the PLORR. Overall, the learning outcomes of 4 polytechnics exceeded the 50% target and Program Learning Outcomes (PLO) could be further enhanced by making improvements using Continuous Quality Improvement (CQI).

Keywords*: Diploma in Information Technology (Digital Technology), Program Learning Outcomes Review Report (PLORR)*

1. INTRODUCTION

The program of Diploma in Information Technology (Digital Technology) or known as DDT is a new program that been introduced in Polytechnics that offers information technology programs under the Department of Information & Communication Technology (JTMK). There are two modes of study which are 2.5 and 3 years of program implementation. The implementation of the program using the 2.5 years mode is one of the programs under the supervision of the Malaysian Digital Economy Corporation (MDEC) through the National Blue Ocean Strategy (NBOS) which is a new creative approach by the government compared to the conventional 3 years' diploma program. Through this approach, the DDT program is expected to maximize the use of existing resources by adhering to the principles of low cost, high impact and fast implementation. For the DDT program which offers 2.5 years mode, it has been operated since June 2016 and the polytechnics involved are Politeknik Sultan Idris Shah (PSIS), Politeknik Balik Pulau (PBU), Politeknik Ungku Omar (PUO), Politeknik Seberang Prai (PSP) and Politeknik Metro Kuala Lumpur (PMKL). The objective of this study was to identify the effectiveness of the DDT program based on the average student achievement according to the analysis of the Learning Outcomes Achievement Program (PLORR) cohort June 2016 – June 2018 (1st cohort) which uses a 2.5 mode based on the the results of Programme Learning Outcomes (PLO). PLO is been refer to to the process of identifying skills sets expected of students to accomplish upon completing a programme of study that consist of eight domains which are Knowledge; Practical Skills; Social Skills and Responsibilities, Values, Attitudes and Professionalism; Communication, Leadership and Team Skills; Problem Solving and Scientific Skills; Information Management and Lifelong Learning Skills; and Managerial and Entrepreneurial Skills (JPP, 2015).

2. LITERATURE REVIEW

On February 25, 2010, one of the country's key educational agendas was the Polytechnic Transformation that was enacted from 2009-2020. It's aims to contribute the increases in the number of highly skilled works to 37 percent by 2015. The plans to establish the Polytechnic University in 2015 is in line with the goals of sustaining human capital development of polytechnic products and generating a new capability for polytechnic to develop the country's human resources beyond 2020 (JPP,2009). This transformation is introduced in the face of increasing the challenging educational environments and requires action beyond the norm (Norfadila M.N etal., 2011). Moreover, the government has realized the importance of TVET education, and has included its agenda as the third core in the 11th Malaysia Plan to elevate human resources development and making TVET transformation an identified focus field. However, according to the Malaysian Productivity Corporation (MPC), ICT adoption by SMEs in Malaysia is a mere 10%. This is in stark contrast to other developed countries where the adoption stands at 50%. It is concerned that the industries now are potentially lacking of competent workers in any level of position. Most TVET graduates will be working in small-and-medium enterprises (SMEs). In fact, Malaysia is now confirming that the workforce remains competitive in the

global era. Therefore, Malaysia need to focussing on intensifying training programmes for the Human Resources. Thus, many government agencies are providing courses on skills and technology and Technical Vocational Education and Training (TVET) has been given a greater emphasis in order to prepare Malaysians for the profession al world (Nor Ainie A.R., 2017).

2.1 National Blue Ocean Strategy (NBOS)

The National Blue Ocean Strategy (NBOS) approach has been introduces as new creative used by the Government. The idea behind of this strategy is to maximise the use of existing resources by the various ministries involved. This will give you results in the short term"**.** Dato' Sri Mohd Najib bin Tun Abdul Razak, Prime Minister Malaysia**.** According to Tan sri Dr Ali Bin Hamsa, Ketua Setiausaha Negara Malaysia (NBOS, 2015) "The National Blue Ocean Strategy encourages every driver of the initiative to eradicate 'silos' thoughts or approaches and adhere to the principles of low cost, high impact and fast implementation". As such, this is also plan in line with the 11th Malaysia Plan which created 60% of the 1.5 million jobs for TVET graduates (RMK,2016). However, following the government's transformation on 2018, the NBOS approach has been revoked and the framework of the program structure is based on Malaysian Qualification Agency (MQA) (Ainie H.N. & Siti Dianah A.B., 2017).

2.2 Diploma in Information Technology (Digital Technology)

The Diploma in Information Technology (Digital Technology) or known as DDT program is an enhanced of the existing programs called Diploma in Information Technology (Programming) or DIP. The name of the program, formerly known as the Diploma Technology Digital has been rebranded to the Diploma in Information Technology (Digital Technology) by the permission of Department of Polytechnic and Community College (JPPKK) and has been certified by MQA. Table 1. Shows the implementation structure of Diploma in Information Technology.

Table 1. Structure of Diploma in Information Technology.

Criteria	Diploma In Information Technology (Programming))	Diploma In Information Technology (Digital Technology)
Duration	3 Years	2.5 & 3 Years
Mobility	None	Have
Teaching & Learning	16 week of academic	Modular
Cluster	None	4 Domain Cluster
Internship	Have	Have

In terms of the DDT framework, there are 3 sections cover of program development. These 3 sections are Assessment, Student Selection and Curriculum Development as Figure 1.

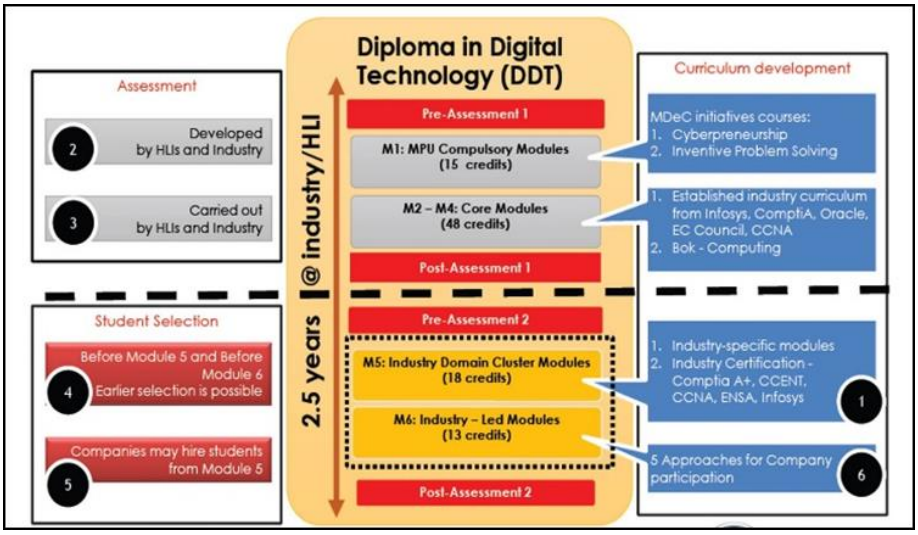

Figure 1. DDT framework

There are 4 tracks involved, Software Application Development, Network System, Information Security and Game Technology. For Internship, it will be implemented at the end of the semester of study and involve the process of acquiring skills related to the knowledge

field. Student will have a real work experience in line with the track and company that interested will take students as a permanent worker if the student performance is good and committed.

3. METHODOLOGY

This study used a combination of qualitative and followed by quantitative method to support the analysis. The Program Learning Outcomes Review Report (PLORR) document is used to analyse the effectiveness of the 2.5 year mode DDT Program. To support the qualitative method, the questionnaire is used as a quantitative method.

3.1 Population and Sampling

The population of this study is focused on DDT students who are directly involved in teaching and learning activities. The questionnaire which was distributed to the students consisted of two sections: Student Information and Employment Information. A total of 163 respondents answered the questionnaire to support the PLORR where the sample number of the study was randomly collected from DDT students, across four polytechnics which are PSIS, PBU, PUO and PSP.

3.2 Research Instrument

There are 9 program learning outcomes analysed as Table 1 and 5 program learning objectives as Table 2. The PLORR analysis was taken from the first cohort (June 2016 - June 2018 Session).

Table 1. Program Learning Outcome (PLO)

PLO	PLO EXPLAINATION
PLO1	apply the foundation of computing, mathematics and soft skills to be competent and possess strong understanding in related Information Technology (IT) fields;
PLO2	practice technical skills by applying appropriate methodologies, models and techniques in IT fields;
PLO3	communicate effectively with IT professionals, other professionals and community;
PLO4	demonstrate strong analytical and critical thinking skills to troubleshoot and solve problems within realistic constrains by applying knowledge, principles and skills in IT;
PLO5	demonstrate an awareness of and consideration for society, health, safety, legal and cultural issues and their consequent responsibilities;
PLO6	acquire life-long learning and professional development to enrich knowledge and competencies;
PLO7	inculcate entrepreneurial skills in the related discipline that contributes towards national growth and be competitive in IT industries;
PLO8	adhere to professional codes of ethics and enhance humanistic values to adapt to the real challenges in working environment; and
PLO9	demonstrate effective leadership and teamwork skills.

Table 2. Program Education Objective (PEO)

PEO	PEO EXPLAINATION
PEO1	possess relevant knowledge, skills and aptitude to meet job specifications, organisational and system needs;
PEO2	can utilise current computing tools and techniques by applying knowledge and interpreting information to solve problems, can execute and be responsible for routine tasks;
PEO3	have effective communication skills to convey information, problems and solutions;
PEO4	have teamwork and interpersonal skills, entrepreneurial awareness and are aware of their social and ethical responsibilities; and
PEO5	possess skills for life-long learning and career development.

4. RESULT AND DISCUSSION

This section discusses the average student achievement based on PLORR's analysis of DDT programs. The target of achieving PLO1 to PLO9 for the first cohort DDT program is 50% as this is a new program run in JTMK. Based on the result, it shows that the percentage of PLO1 to PLO9 for all polytechnics running the DDT program for 2.5 years is between 62% and 87%. Therefore, the result shown in Figure 2 has proven that the learning outcomes of the DDT program for the 4 polytechnics exceed the target of 50%.

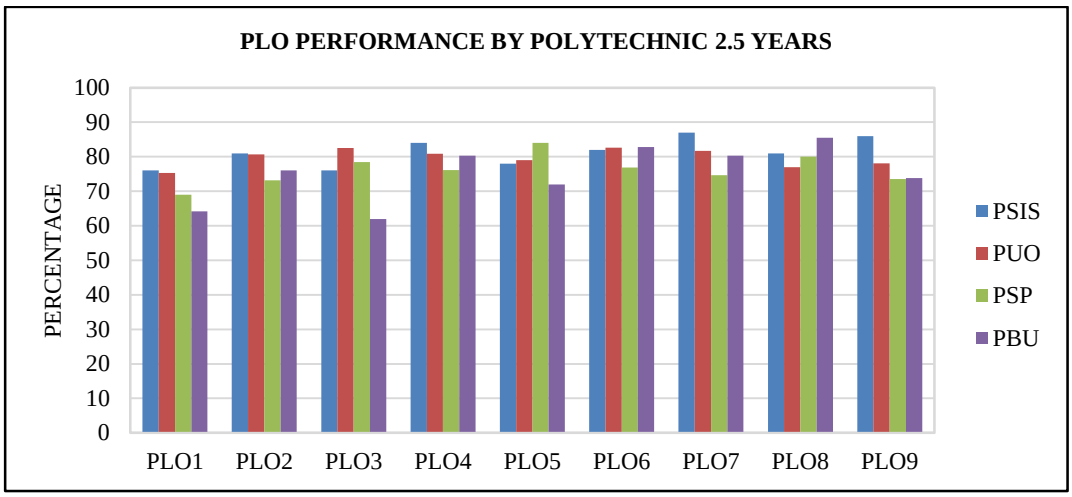

Figure 2. PLO Percentage by Polytechnic

Figure 3 shows the PLO percentages of four polytechnics that run the DDT program for 2.5 years. It was found that all PLOs had exceeded the 50% target, but the PLO with the lowest percentage was PLO1 of 71%. PLO 1 is about apply the foundation of computing, mathematics and soft skills to be competent and possess strong understanding in related Information Technology (IT) fields. PLO1 is lower than other PLOs because the academic week during the short semester is between 6 and 8 weeks only. As for mathematics competency, the requirement to enter the polytechnic for DDT Program is Grade C and above. Besides SPM leavers, Community College graduates in related fields are also qualified to apply for DDT Program in Polytechnics. The minimum result for Mathematics from Community College graduates is pass and its contribute to a low percentage of PLO1. However, the highest average for PLO for all four polytechnics is 81% which is for PLO6, PLO7 and PLO8.

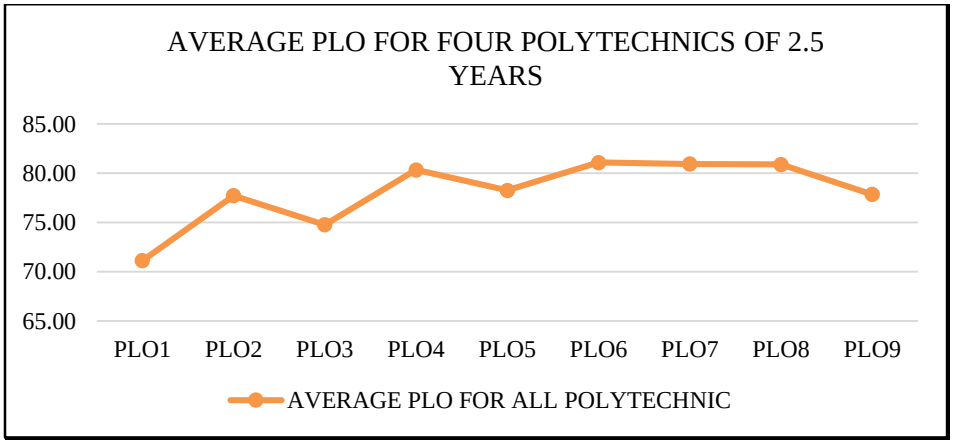

Figure 3. Average Percentage of PLO1 - PLO9 for 4 Polytechnics 2.5 Years

PLO6 is associated with acquiring life-long learning and professional development to enrich knowledge and competencies. Each student is encouraged to attend industry talks and seminars related to courses taken to enhance their understanding and knowledge. Students are also encouraged to obtain professional certificates such as Cisco Certified Network Associate (CCNA), Oracle Database and others to enhance student competence in related fields. Students are also allowed to participate in external competitions such as Polyskill, Worldskill Malaysia, FIRA Malaysia Cup and so on. Student participation in competitions can help them become more competent in related courses thus increasing the PLO6 percentage. PLO 7 is related to inculcate entrepreneurial skills in the related discipline that contributes towards national growth and be competitive in IT industries. Students have been exposed to the realities of becoming entrepreneurs where every student is required to open a booth to sell and promote their products. Students are also involved in industry-led entrepreneurship incubators where they are

exposed to how to repair computers and smartphones. Besides, students also encouraged to join academic visits related to entrepreneurship such as '*Hasil Laut' 'Paksu', 'Fama', 'Jabatan Pertanian', 'Tu..Dia Pak Tam'* and others to expose students to venture into entrepreneurship. PLO8 is related to adhere to professional codes of ethics and enhance humanistic values to adapt to the real challenges in the working environment. The increasing percentage of PLO8 is due to teaching and learning activities that involve such as academic visits that related to information technology. Other activities that have been implemented throughout student's learning session in polytechnics to ensure the PLO achievement beyond the 50% target include continuous practice through modules, strengthening student communication skills through planning appropriate activities such as project presentations and collaborative activities with the industry for the Final Year Student Project Competition. In order to support this Program Learning Outcomes Review Report (PLORR), a questionnaire was distributed to DDT students.

Table 4 showed the percentage of the respondent background of DDT students. The total number of respondents was 163 students consisting of students who had completed their studies in the DDT program in 4 polytechnics. Based on the overall number of respondents, it was found that 65% female students answered the questionnaire compared to 35% male students. Besides, there are 49.1% respondents are from PBU, followed by PSP 22.7%, PUO 12.9% and PSIS 15.3%. Students from the Software and Application Development Track were the most respondents to this questionnaire of 79.8%. Furthermore, students who got CGPA 3.5 and above were only 28.2% while the percentage of students with CGPA less than 3.5 to 3.00 was among the highest with 86%.

Table 4. Respondent Background

Demographic Profile	Frequency	Percentage (%)
Gender		
Male	57	35%
Female	106	65%
Polytechnic		
PSIS	25	15.3%
PSP	37	22.7%
PUO	21	12.9%
PBU	80	49.1%
Track of Study		
Networking System	20	12.3%
Software and Application	130	79.8%
Development Information Security	13	8%
CGPA		
CGPA >=3.5	46	28.2%
CGPA <3.5 & CGPA >=3.00	86	52.8%
CGPA <3.00 & CGPA >=2.5	25	15.3%
CGPA <2.5 & CGPA >=2.00	4	2.5%
CGPA <2.00	2	1.2%

Table 5 shows the questionnaire items on student employment information to support the 2.5 years DDT PLORR.

Table 5. Questionnaire Items

Item	Questions	Percentage
S1	Employment Status	Employed (Has an employee / self-employed / entrepreneur) = 47.9% Unemployed = 31.9% Further studies = 20.2%
S2	Did you work in the same field that you learned while in polytechnics?	Yes = 17.9% No = 82.1%
S3	Current job field	Government = 7.7% Private = 75.6% Employee = 10.3% Self-Employed = 2.6% Family Business = 3.8%

Based on the employment status in Figure 4, it is found that 47.9% of 2.5 years DDT students have worked in various sectors. Meanwhile, 31.9% were unemployed and 20.2% of students will further their studies. Based on the result obtained it is found that PLO6, PLO7 and PLO8 has strongly support the PEO4 and PEO5 outcome.

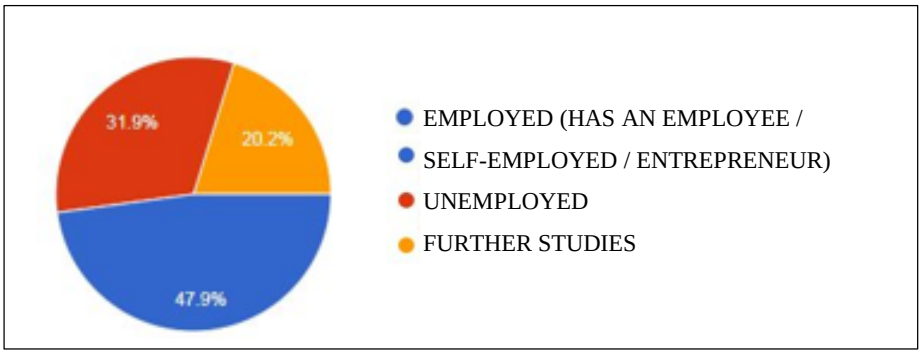

Figure 4. Job Status

Figure 5 shows the percentage of students working in the field of study in polytechnics. 82.1% of the students stated that they did not work in the field of study while 17.9% of the students work in the field of studies in polytechnics. Given that PLO1 has a low percentage, this has affected the results of S2 questionnaire, with only 17.9% of students working in the field of study.

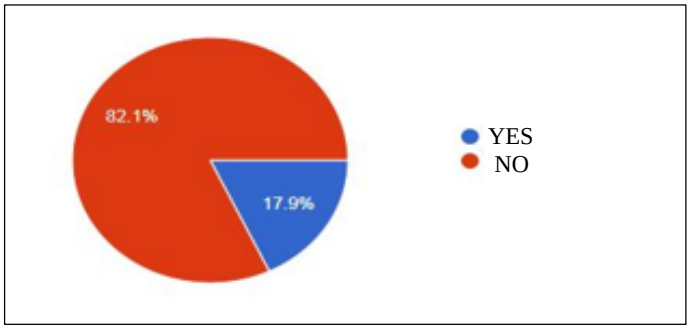

Figure 5. Percentage of Students Working in the Fields of Study

Figure 6 shows the percentage of the employment sector where 75.6% of the students work in the private sector. Followed by 10.3% as employers, 7.7% worked as civil servants, 3.8% worked with families and the lowest percentage was 2.6% self-employed.

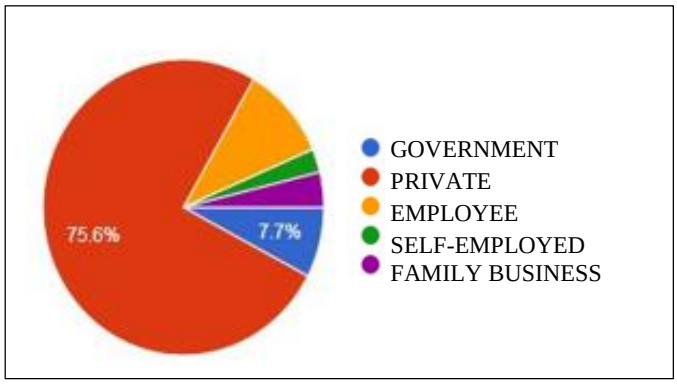

Figure 6. Percentage of Employment Sector

5. CONCLUSION

In conclusion, it was found that the learning outcomes of all 4 polytechnics involved in the 2.5 year mode exceeded the 50% target. There are several suggestions that can be taken to give the impact for the future implementation of the DDT Program such as strengthening the structure of the DDT program, exposing students to track selection through roadshow, using technology in line with Industrial Revolution (IR) 4.0 approaches such as Virtual Reality in learning, Collaborative Classroom, Educational Applications and conducting study visits and collaborating with industry to expand their career in DDT. For improvement, the use of Continuous Quality Improvement (CQI) will be done to produce quality learning in the future.

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