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## Skill development and career advancement: survey of the effectiveness of the fiber optic cable professional certification course - CA1C internal network and CA2C external network

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### ABSTRACT

The employability of graduates requires a holistic student to deal with global competition and technological change. The Ministry of Higher Education through polytechnics has given students the opportunity to obtain various Professional Certifications for student skills. This study focuses on the effectiveness of the Fiber Optic Cable Professional Certification Course. The primary objectives of this study are to evaluate the effectiveness of the course in helping students obtain Fiber Optic Professional Certificate Cable - CA1C Internal Network and CA2C External Network, and to assess the perceived value of the competency certificate for career advancement after graduation. This study was conducted on Diploma in Electronic Engineering (Communication) Students, JKE PKT by using a question instrument survey of 20 students who took this course. Results show more than 85% of students obtained the Professional Certificate of Fiber Optic Cable - Internal Network CA1C and more than 75% obtained External Network CA2C. More than 95% of students have agreed that their level of understanding and knowledge has increased after following this course. The results also found that the majority of students agreed the importance of this Competency Certificate in their career advancement in the field of study.



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## Introduction

The system and quality of the country's higher education has gone through several phases of transformation along with the passage of time and the current situation. Through the Malaysian Education Development Plan 2015 - 2025 (Higher Education), Leap One emphasis is placed on producing holistic, entrepreneurial and balanced graduates, while Leap Four focuses on TVET graduates who contribute to the labor market at the local and global level. In Pelan Strategik JPPKK 2018-2025 Book, Polytechnics and Community Colleges have taken strategic steps in increasing the marketability of graduates through the addition of certain competencies that can give competitive advantages in the technical and soft

skills fields. For that, the Department of Electrical Engineering, Kuala Terengganu Polytechnic organizes the certifying fiber optic course (CA1C & CA2C) which includes learning in the field of fiber optics that meets SKMM standards. The course is completed with a competency assessment aimed at evaluating the skills of participants who have finished the course to obtain CA1C and CA2C Competency Certificates.

For CA1C, the modules will encompass a comprehensive scope of telecommunication networks and expertise in Fiber Optic cabling. Additionally, participants will receive instruction on Fiber to the Home (FTTH) concepts, various types of fiber optic cables (both indoor and outdoor), internal cabling techniques, specifications, and the termination procedures for fiber optics in residential buildings in accordance with technical regulations set by MCMC. Moreover, the course will cover the utilization of testing equipment for fiber optic network analysis. As for the CA2C module, the curriculum delves into subjects including an overview of fiber optic cables and workplace safety, the process of installing and routing fiber optic cables in sub ducts, pulling cables aloft poles, connecting fiber optic cables through splicing, and conducting tests on fiber optic cables.

The issuance of this Fiber Optic Efficiency Certificate is under the supervision of MCMC in collaboration with Telekom Malaysia and is only provided to those who pass the fiber optic efficiency test. This test is a simple objective test to test the skills of installing and testing fiber optic internal and external parts. This learning session follows the syllabus as follows which includes Telekom Malaysia's fiber optic cabling work procedures.

Therefore, the focus of this study is to evaluate the effectiveness of the course in helping students to obtain Fiber Optic Professional Certificate Cable - CA1C Internal Network and CA2C External Network, and to assess the perceived value of the competency certificate for career advancement after graduation. This study was conducted at the Department of Electrical Engineering involving students taking the Fiber Optic Course DEP40053 for the year 2023 by using a questionnaire instrument involving 20 students.

## Method

This study was conducted on 20 students who took the Fiber Optic Professional Certificate Cable Course - CA1C Internal Network and CA2C External Network in 2023 semester 4 students, Electronic Engineering Diploma (Communications), Kuala Terengganu Polytechnic. A questionnaire method has been created which is a popular instrument in studies built according to the Keep It Short and Simple (KISS) principle by asking simple and easy to understand questions, according to R.Kuberan et al, (2013). According to Wiersma, W. & Jurs, S. (2009), questionnaires can be used to measure attitudes and opinions with various amounts of variables and in natural conditions.

For that, the scale used in this study is "Strongly Agree (5)", "Agree (4)", "Not Sure (3)", "Disagree (2)" and "Strongly Disagree (1)". Twelve questions were given to students to obtain a survey related to the effectiveness of CA1C and CA2C Fiber Optic Courses. The summary of this survey then expressed in a display of agree and not agree and also a graph display. While ten questions related to the Importance of the Compensatory Certificate in the career development of students after graduating are shown in Figure 3 and the graph display is then shown in graph 2.

## Result and Discussion

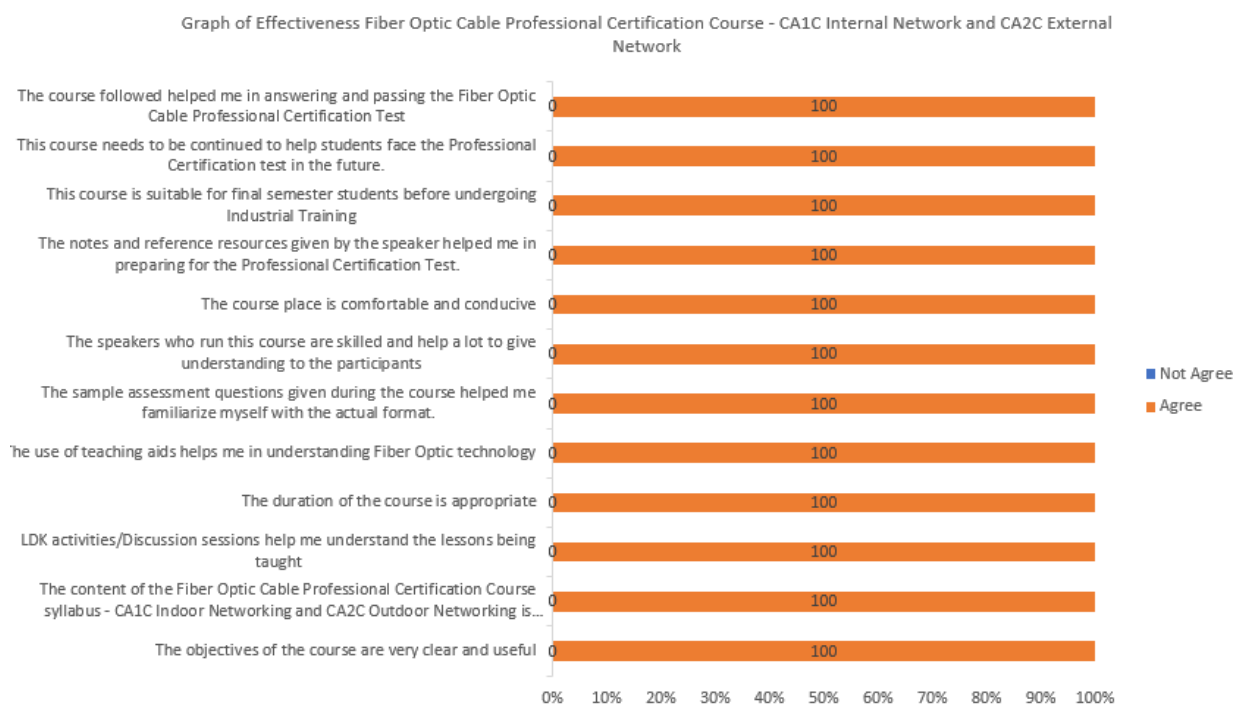
Quantitative data findings in Table 1 show responses from 20 respondents, 4th semester DEP, JKE Kuala Terengganu Polytechnic students in 2023 who answered the questionnaire regarding the Effectiveness of the Fiber Optic Cable Professional Certification Course - CA1C Internal Network and CA2C External Network. The explanation is on Table 1.

Table 1 <Internal Network CA1C and External Network CA2C students semester 4 DEP, JKE Polytechnic Kuala Terengganu in 2023>

Question	Likert scale				
	1	2	3	4	5
The objectives of the course are very clear and useful	0 (0%)	0 (0%)	0 (0%)	4 (20%)	16 (80%)
The content of the Fiber Optic Cable Professional Certification Course syllabus - CA1C Indoor Networking and CA2C Outdoor Networking is appropriate	0 (0%)	0 (0%)	0 (0%)	1 (5%)	19 (95%)

Question	Likert scale				
	1	2	3	4	5
LDK activities/Discussion sessions help me understand the lessons being taught	0 (0%)	0 (0%)	0 (0%)	11 (55%)	9 (45%)
The duration of the course is appropriate	0 (0%)	0 (0%)	0 (0%)	6 (30%)	14 (70%)
The use of teaching aids helps me in understanding Fiber Optic technology	0 (0%)	0 (0%)	0 (0%)	4 (20%)	16 (80%)
The sample assessment questions given during the course helped me familiarize myself with the actual format.	0 (0%)	0 (0%)	0 (0%)	0 (0%)	20 (100%)
The speakers who run this course are skilled and help a lot to give understanding to the participants	0 (0%)	0 (0%)	0 (0%)	0 (0%)	20 (100%)
The course place is comfortable and conducive	0 (0%)	0 (0%)	0 (0%)	10 (45%)	10 (50%)
The notes and reference resources given by the speaker helped me in preparing for the Professional Certification Test.	0 (0%)	0 (0%)	0 (0%)	0 (0%)	20 (100%)
This course is suitable for final semester students before undergoing Industrial Training	0 (0%)	0 (0%)	0 (0%)	6 (30%)	14 (70%)
This course needs to be continued to help students face the Professional Certification test in the future.	0 (0%)	0 (0%)	0 (0%)	0 (0%)	20 (100%)
The course followed helped me in answering and passing the Fiber Optic Cable Professional Certification Test	0 (0%)	0 (0%)	0 (0%)	6 (30%)	14 (70%)

Therefore, the summary from Table 1 has been summarized in Table 2 to show the selection of students in which the data answered for scale 1,2, data 3 (disagree, less agree, and not sure) are collected as 'disagree' and data for scales 4 and 5 (agree and strongly agree) are grouped as 'agree' with the Effectiveness of the Fiber Optic Cable Professional Certification Course that has been followed. The percentage results from Table 2 have been shown in the form of a bar graph like Figure 1.



**Figure 1 <Graph of Effectiveness Fiber Optic Cable Professional Certification Course - CA1C Internal Network and CA2C External Network>**

Table 2 &lt;The summary from Table 1 shows that the majority of students agree with the Effectiveness of the Fiber Optic Cable Professional Certification Course - Internal Network CA1C and External Network CA2C&gt;

Item Questionnaire	Number of Students DEP semester 4 JKE		Percent (%)	
	Disagree	Agree	Disagree	Agree
1	0	20	0	100
2	0	20	0	100
3	0	20	0	100
4	0	20	0	100
5	0	20	0	100
6	0	20	0	100
7	0	20	0	100
8	0	20	0	100
9	0	20	0	100
10	0	20	0	100
11	0	20	0	100
12	0	20	0	100

While the survey regarding the importance of Certificate of Competency for career development after graduation has been shown in Table 3.

Table 3 &lt;Student Responses to the Importance of Competency Certificates for Student Career Advancement After Graduation&gt;

No	Question	Likert scale				
		1	2	3	4	5
1	This Fiber Optic Cable Professional Certification helps add value to my skill level in the future in addition to the academic certificate obtained.	0 (0%)	0 (0%)	0 (0%)	0 (0%)	20 (100%)
2	My self-confidence level increased after successfully obtaining this compensation certificate for career advancement after my graduation.	0 (0%)	0 (0%)	0 (0%)	0 (0%)	20 (100%)
3	This Competency Certificate helps me develop my career in the field of Electronics (Communications)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	20 (100%)
4	I plan to use this certificate in the future if I want to apply for a career in the field of Communication (Fiber Optics)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	20 (100%)
5	I know the importance of having this certificate because it is mandatory if you want to do internal and external fiber optic practical work under the supervision of SKMM	0 (0%)	0 (0%)	2 (10%)	11 (55%)	7 (35%)
6	I will retake this Competency certificate if i am not successful in the test i have sat before.	0 (0%)	0 (0%)	4 (20%)	14 (70%)	2 (10%)
7	I have an advantage in terms of skills compared to those who do not have this certificate if interviewed by an employer in the future.	0 (0%)	0 (0%)	0 (0%)	0 (0%)	20 (100%)
8	The validity period of the certificate (5 years) is very suitable for me to plan my career progress	0 (0%)	0 (0%)	0 (0%)	0 (0%)	20 (100%)
9	I plan to renew the validity of the certificate after the expiration if I am involved in the field of fiber optic communication in the future.	0 (0%)	0 (0%)	3 (15%)	13 (65%)	4 (20%)
10	I am confident that I can create and solve problems related to optical fiber-internal network and external network if given an assignment.	0 (0%)	0 (0%)	0 (0%)	14 (70%)	6 (30%)

Therefore, the summary depicted in Table 3 has been condensed into Table 4 to showcase the group of students for whom the data related to scales 1, 2 and 3 (disagreement, partial agreement, and uncertainty) has been classified as 'disagree,' while the data for scales 4 and 5 (agree and strongly agree) has been combined as agree. The percentage results from Table 3 have been shown in the form of a bar graph like Figure 2.

Table 4 <The summary from Table 3 shows that the majority of students agree with the Importance of Certificate of Competence for Career Advancement of Students After Graduation>

Item Questionnaire	Number of Students DEP semester 4 JKE		Percent (%)	
	Disagree	Agree	Disagree	Agree
1	0	20	0	100
2	3	17	15	85
3	0	20	0	100
4	0	20	0	100
5	4	16	20	80
6	2	18	10	90
7	0	20	0	100
8	0	20	0	100
9	0	20	0	100
10	0	20	0	100

Graf of Perspectives on the importance of Certificate of Competency for Career Advancement to Students After Graduation

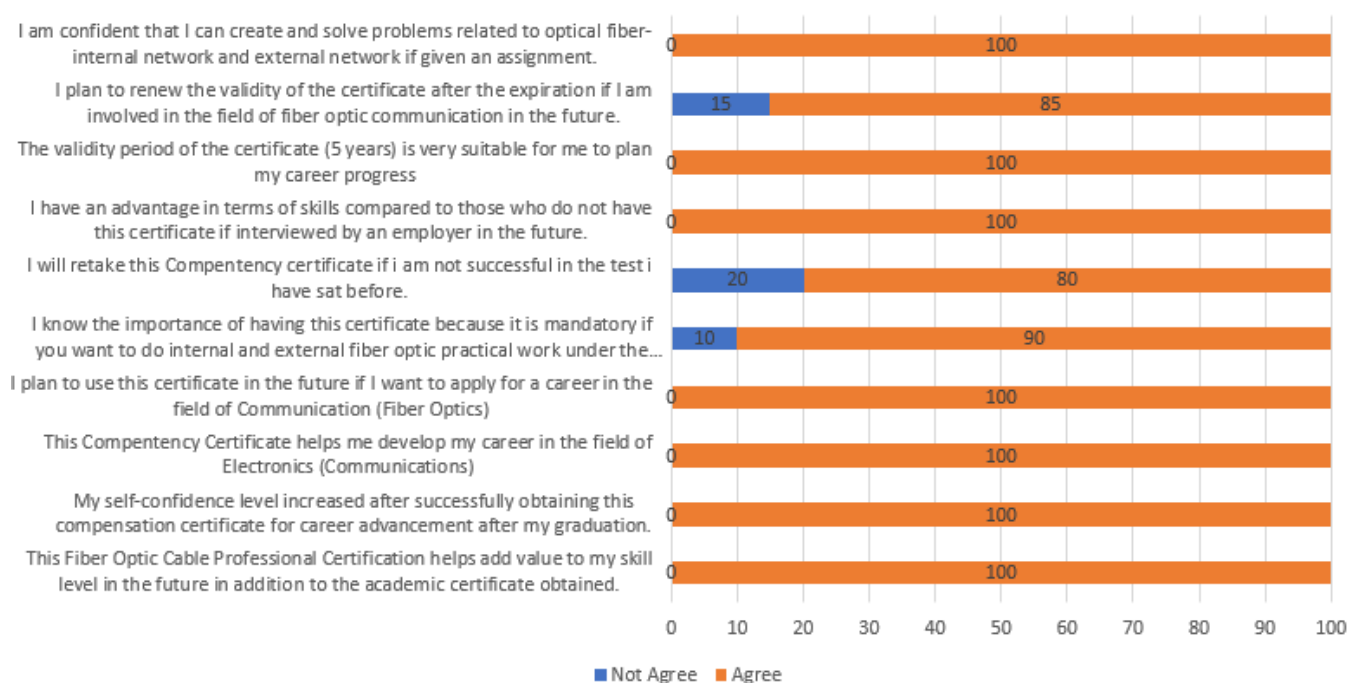


Figure 2 <Graf of Perspectives on the importance of Certificate of Competency for Career Advancement to Students After Graduation>

## Conclusions

The investigation conducted during the CA1C and CA2C Fiber Optic Professional Certification courses has proven highly advantageous for students pursuing the Electronics Engineering (Communications) Diploma aiding them in achieving the Fiber Optic Professional Certificate. The course content aligns effectively with the certification test syllabus established by Telekom Malaysia for the certification examination. During the CA1C and CA2C Fiber Optic Test, a total of 20 students engaged in the exam, with 17 students successfully passed the CA1C Fiber Optic Test, representing a pass rate, of 85%, and 15 students passed the Fiber Optic CA2C test, representing a 75%pass rate. Feedback from students indicates a unanimous agreement on the effectiveness of the Fiber Optic Cable Professional Certification Course, with a 100% approval rate. Furthermore, it is evident that a significant majority, at least 80%, recognize the importance of the certificate of competence for their future career progression.

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