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THE LIFE AND CAREER SKILLS AMONG TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING (TVET) STUDENTS

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ABSTRACT--*Unemployment is one of the problems faced in many countries. A gap between the skills required by employers and possessed by graduates is one of the factors of unemployment. In such situations, it is important to investigate whether life and career skills are being embedded by higher education institutions, especially in technical and vocational education since it provides a semi-skilled and skilled workforce to compete in the global labor market. This study was conducted to investigate the differences between life and career skills among technical and vocational education and training (TVET) students in different departments in Malaysia. The quantitative research involves TVET students who enrolled in diploma programs at polytechnics in Malaysia. There were five departments involved in this study, namely the Electrical Engineering Department (EE), the Mechanical Engineering Department (ME), the Civil Engineering Department (CE), the Department of Commerce (COMM) and the Tourism and Hospitality Department (TH). A total sample of 821 diploma students from three types of polytechnics (Premier, Conventional and METrO) was selected using a disproportionate sampling method. Data was collected using a questionnaire with Likert Scale 5, consisting of 80 items. The collected data were analyzed using the Statistical Package for the Social Science (SPSS) program version 21 with an analysis of variance (ANOVA) used as statistical analysis. The finding suggested that students in the five different departments possessed no difference in productivity and accountability skills, and responsibility and leadership skills. Meanwhile, students from the five different departments have similarities in terms of initiative, self-direction, social and cross-cultural skills. Different departments have their ways of embedding their teaching and learning process towards their students. This study may be used to promote and assist in higher education, specifically polytechnics and industries to improve and enhance TVET programs. The students should be provided with training and skills to survive in the real working environment.*

Keywords-- *21st Century Education, Life and Career Skills, Transferable Skills, TVET.*

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I. INTRODUCTION

21st-century skills are defined as the set of skills students need to possess in learning, work and life in this century, which comprise of a variety of skills, including learning and innovation skills, digital literacy skills and life and career skills [1]. There are several discussions concerning the transformation of Technical and Vocational Education and Training (TVET) in the 21st century. The main concerns are the students and teachers, and the education challenges faced by them in the 21st century. the great challenges to TVET should be addressed to ensure that Malaysia can achieve a developed nation status [2]. It cannot be denied that the foundation of vocational education in the country has already been developed, and that will enable Malaysia to plan and move towards that goal. However, the challenge that we will face in the coming years more so in the economic crisis facing the country today, vocational educators should be competitive and sensitive to the changes taking place [3]. They must have sufficient skills, and the other employees or teachers must also be well-educated.

The process of transforming TVET students in the 21st-century first and foremost, educators need to identify 21st-century learners and the environment. TVET is concerned with the acquisition of knowledge and skills for the world of work. Throughout history, various terms have been used to describe elements of the field that are now conceived as comprising TVET – a vocational and technical education sector and higher education sector that have their own goals in producing a human resource for Malaysian development [4]. Currently, Malaysia has produced three types of polytechnics, namely Premier, METrO and Conventional [5]. Each type of polytechnic has its purposes and functions. However, their main aim is to produce a skilled workforce for Malaysia. This can be achieved by producing graduates at a semi-professional level in engineering, commerce, hospitality, ICT and services, and providing an alternative route to higher education, namely to the public or private institutions for post-secondary students [5].

TVET's goal is to become a skilled and semi-skilled workforce, whereby the skills to get jobs and the skills to live amidst the 21st-century challenges are balanced between life and career. Skill gaps which exist between employers' requirement and the skills possessed by graduates or job seekers were the issue that has always been raised among the society around the world [6, 7, 8]. Findings from statistical reports regarding the unemployment rate also proved that the unemployment issue needs to be addressed seriously to produce future workforce [9, 10]. When talking about studying and graduating, the graduates' next biggest hope yet is to get employed. With the ideal assumption that every graduate will get employed, every educational institution needs to work hard so that the assumption can be made certain. However, the current world situations do not promise the ideal assumption to be made certain easily.

The real problem is that employers are having problems finding workers who have the skills or job readiness that can help them to fit into and stay and remain in the working environment [7]. The ideal perception of students studying in higher education institutions is getting a suitable job upon graduation. This may come true if, during learning, students were nurtured with life and career skills that enable future work survival. Therefore, the research questions of this study are:

Is there any difference between flexibility and adaptability skills among TVET students enrolled in different courses under different departments in polytechnics?

Is there any difference between initiative and self-direction skills among TVET students enrolled in different courses under different departments in polytechnics?

Is there any difference between social and cross-cultural skills among TVET students enrolled in different courses under different departments in polytechnics?

Is there any difference between productivity and accountability skills among TVET students enrolled in different courses under different departments in polytechnics?

Is there any difference between responsibility and leadership skills among TVET students in different courses under different departments in polytechnics?

II. LIFE AND CAREER SKILLS

Living in the 21st century urges people to have 21st-century skills, especially higher education students who ideally think that they will be employed upon graduation. If so, students should take the chance to enhance and learn the skills needed to be employed. Life and career skills comprise skills that students need to possess to expand their opportunities in gaining employment. Life and career skills comprise what most employers consider as employability skills but from a broader perspective. Life and career skills comprised what people especially employers and educational institutions consider as employability skills but from a broader perspective. These skills cater more than employability skills, soft skills, technical skills, and academic skills to survive to live in the 21st century. The new learning paradigm is the formulation of essential 21st-century skills with the direct aim of teaching students to learn and work well with 21st-century skills. According to the new learning paradigm, to produce job-ready students, these four domains need to be taught to the students. Each domain has specific elements that need to be emphasized in every teaching and learning process.

Table 1: Example of every element in each domain the New Learning Paradigm

Domain	Example
Traditional Core Skills (TCS)	Reading, writing, and arithmetic or basic literacy and numeracy.
Learning and Innovation Skills (LIS)	Critical thinking, problem solving and creativity
Career and Life Skills (CLS)	Flexibility, adaptability, initiative, teamwork and leadership
Digital Literacy Skills (DLS)	Technological proficiency, digital fluency, computing, media and information literacy

This study emphasized only in life and career skills. This domain has five important main skills that contribute to the answers to the research questions and fulfill the objectives of this study.

III. METHODOLOGY

Research Design

A quantitative approach using a cross-sectional survey design was employed to determine the information of life and career skills from respondents. This research design is usually used by researchers due to its advantage in providing a current overview of the variables that become the focus of the study [11]. Hence, this research design guides the researcher to collect the data systematically using questionnaire as an instrument towards a specific population in which the respondents for this study are students from three types of the polytechnic in Malaysia on a specific purpose of determining the life and career skills of the polytechnic students. The data analysis commenced when all of the questionnaires were returned to the researcher. The data were analyzed using Statistical Package for the Social Science (SPSS) program version 21 with Analysis of variance (ANOVA) used as statistical analysis.

Population and Sampling

This study involves TVET students who enrolled in diploma programs in three types of polytechnics in Malaysia. Currently, there are a total of 33 established polytechnics in Malaysia. These polytechnics were divided into three different types, which are Premier polytechnics, Conventional polytechnics, and METrO (Maximizing Education and Training Opportunities) polytechnics. To find the sample size, this study applied the stratified random sampling strategy. This sampling strategy is suitable for researchers who are interested in particular groups or strata within the population [12]. A total sample of 821 diploma students from three types of polytechnics (Premier, Conventional and METrO) was selected using a disproportionate sampling method.

Research Instrument and Validation

The questionnaires were administered to get the respondents to answer regarding the variables inspected, which are the elements of 21st-century life and career skills. The contents of the questionnaire were checked by an expert beforehand, whereby the expert had given comments for improvements to be made to achieve the desired objectives. A total number of 250 polytechnic students from several polytechnics in Perak, Malacca, Perlis, and Selangor were involved in the pilot study that was carried out to test the instrument. Several items were deleted because the Cronbach Alpha value was lower than 0.7. The total initial items were 94 and after deleting 14 items, the total finalized items were 80 items.

IV. FINDINGS

A one-way between-groups analysis of variance (one-way ANOVA) was conducted to explore the difference between departments, where students had both life and career skills. The total respondents involved in this study were 475 (57.9%) male students and 346 (42.1%) female students. A total of 214 (26.1%) of the respondents were from Premier polytechnic (PUO) that consist of 168 (20.5%) male students and 46 (5.6 %) female students. There were five departments involved in this study, namely Electrical Engineering Department (EE), 376 (45.8%); Mechanical Engineering Department (ME), 115 (14.0%); Civil Engineering Department (CE), 155 (18.9%); Department of Commerce (COMM), 153 (18.6%) and Tourism and Hospitality Department, 22 (2.7%).

Is there any difference between flexibility and adaptability skills among TVET students enrolled in different courses under different departments in polytechnics?

Levene's test for homogeneity of variance was conducted and the Sig. value was $p = 0.508 > 0.05$ as shown in Table 2. Therefore, there was no significant difference between the group's variances. Table 3 shows that there was a statistically significant difference at the $p < 0.05$ level in the score for the five departments on flexibility and adaptability skills elements $F(4, 816) = 3.514$, $p = 0.007$. Post-hoc comparison using Tukey HSD test (refer to Table 4) indicated that the mean between COMM and EE was found to have significant difference (Mdiff = 0.14602, p = 0.033) and COMM and ME were also found to have significant difference (Mdiff = 0.19219, p = 0.027) in flexibility and adaptability skills dimension.

Table 2: Test of Homogeneity of Variances for Flexibility and Adaptability skills

Levene Statistic	df1	df2	Sig.
.827	4	816	.508

Table 3: ANOVA table for Flexibility and Adaptability skills

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.928	4	.982	3.514	.007
Within Groups	228.012	816	.279		
Total	231.940	820			

Table 4: Post-hoc test using Tukey HSD for Flexibility and Adaptability skills

(I) Department code for student	(J) Department code for student	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
EE	ME	-.04617	.05633	.925	-.2002	.1078
	CE	.06416	.05046	.709	-.0738	.2021
	COMM	.14602*	.05069	.033	.0074	.2846
	TH	.21365	.11595	.350	-.1033	.5306
ME	EE	.04617	.05633	.925	-.1078	.2002
	CE	.11033	.06506	.437	-.0675	.2882
	COMM	.19219*	.06524	.027	.0138	.3705
	TH	.25982	.12301	.216	-.0765	.5961
CE	EE	-.06416	.05046	.709	-.2021	.0738
	ME	-.11033	.06506	.437	-.2882	.0675
	COMM	.08186	.06024	.654	-.0828	.2466
	TH	.14949	.12043	.727	-.1798	.4787
COMM	EE	-.14602*	.05069	.033	-.2846	-.0074
	ME	-.19219*	.06524	.027	-.3705	-.0138
	CE	-.08186	.06024	.654	-.2466	.0828
	TH	.06763	.12053	.981	-.2619	.3971
TH	EE	-.21365	.11595	.350	-.5306	.1033
	ME	-.25982	.12301	.216	-.5961	.0765
	CE	-.14949	.12043	.727	-.4787	.1798
	COMM	-.06763	.12053	.981	-.3971	.2619

*

. The mean difference is significant at the 0.05 level.

Is there any difference *between initiative and self-direction skills among TVET students enrolled in different courses under different departments in polytechnics?*

Table 5 shows that the homogeneity of variances is violated, so the correction of the degree of freedom was performed using Brown-Forsythe with p = 0.025 (refer to Table 7). The ANOVA test in Table 6 shows significant differences in initiative and self-direction between students studying in different courses F (4, 509.316) = 2.406, p = 0.048). A post-hoc test using Tamhane Multiple Comparison procedure (refer to Table 8) was conducted, and the only meaningful difference was found between EE and TH (Mdiff = 0.26626, p = 0.028).

Table 5: Test of Homogeneity of Variances for Initiative and Self-direction skills

Levene Statistic	df1	df2	Sig.
2.643	4	816	.033

Table 6: ANOVA table for Initiative and Self-direction skills

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.029	4	.757	2.406	.048
Within Groups	256.814	816	.315		
Total	259.843	820			

a. Asymptotically F distributed

Table 7: Robust test of Equality means for Initiative and Self-Direction Skills

	Statistic[a]	df1	df2	Sig.
Welch	3.386	4	138.470	.011
Brown-Forsythe	2.804	4	509.316	.025

Table 8: Post-hoc test using Tamhane Multiple Comparison for Initiative and Self-direction skills

(I) Department code for student	(J) Department code for student	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
EE	ME	.06977	.05639	.914	-.0898	.2294
	CE	.11343	.05783	.407	-.0498	.2767
	COMM	.10355	.05260	.401	-.0448	.2519
	TH	.26626*	.08132	.028	.0189	.5136
ME	EE	-.06977	.05639	.914	-.2294	.0898
	CE	.04366	.06952	.999	-.1526	.2399
	COMM	.03379	.06523	1.000	-.1505	.2180
	TH	.19650	.09001	.299	-.0701	.4631
CE	EE	-.11343	.05783	.407	-.2767	.0498
	ME	-.04366	.06952	.999	-.2399	.1526
	COMM	-.00987	.06648	1.000	-.1974	.1776
	TH	.15284	.09092	.652	-.1158	.4214
COMM	EE	-.10355	.05260	.401	-.2519	.0448
	ME	-.03379	.06523	1.000	-.2180	.1505
	CE	.00987	.06648	1.000	-.1776	.1974
	TH	.16271	.08769	.524	-.0984	.4238
TH	EE	-.26626*	.08132	.028	-.5136	-.0189
	ME	-.19650	.09001	.299	-.4631	.0701
	CE	-.15284	.09092	.652	-.4214	.1158
	COMM	-.16271	.08769	.524	-.4238	.0984

Is there any difference between social and cross-cultural skills among TVET students enrolled in different courses under different departments in polytechnics?

Levene's test for homogeneity of variance was conducted, and the Sig. value is p = 0.111 > 0.05 as shown in Table 9. Therefore, the homogeneity of variance assumption is not violated, and it can be concluded that there is no significant difference between the group's variances. For the social and cross-cultural skills, and the respondents' department variables, there is a statistically significant difference at the p > 0.05 level in the score for the five departments on initiative and self-direction: F (4, 816) = 4.108, p = 0.003 as shown in Table 10. Post-hoc comparison using Tukey HSD test (refer to Table 11) indicated that the mean between CE and EE was found to have significant difference (Mdiff = 0.15695, p = 0.043) and CE and COMM was also found to have significant difference (Mdiff = 0.23738, p = 0.004) in social and cross-cultural skills dimension.

Table 9: Test of Homogeneity of Variances for Social and Cro

Levene Statistic	df1	df2	Sig.
1.887	4	816	.111

ss-cultural skills

Is there any difference between productivity and accountability skills among TVET students enrolled in different courses under different departments in polytechnics?

Table 12 shows that the homogeneity of variances is violated, so the correction of the degree of freedom was performed using Brown-Forsythe with p = 0.147 (refer to Table 14). The ANOVA test in Table 13 shows no significant differences in productivity and accountability between students studying in different courses F (4, 448.265) =1.485, p = .205. The post-hoc test was not necessary since there was no significant difference between the five departments on productivity and accountability dimensions.

Is there any difference between responsibility and leadership skills among TVET students in different courses under different departments in polytechnics?

Table 15 shows that the homogeneity of variances is violated, so the correction of the degree of freedom was performed using Brown-Forsythe with p = 0.010 (refer to Table 17). The ANOVA test in Table 16 shows significant differences in responsibility and leadership skills between students studying in different courses F (4, 419.575) = 3.076, p = 0.016. The post-hoc test using Tamhane Multiple Comparison procedure (refer to Table 18) was conducted and the only meaningful difference was found between COMM and CE (Mdiff = 0.20773, p = 0.018) on responsibility and leadership skills dimension.

Table 10: ANOVA table for Social and Cross-cultural skills

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.698	4	1.424	4.108	.003
Within Groups	282.942	816	.347		
Total	288.639	820			

Table 11: Post-hoc test using Tukey HSD for social and cross-cultural skills

(I) Department code for student	(J) Department code for student	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
EE	ME	-.02091	.06275	.997	-.1925	.1506
	CE	-.15695*	.05621	.043	-.3106	-.0033
	COMM	.08043	.05647	.612	-.0739	.2348
	TH	.20860	.12916	.488	-.1445	.5617
ME	EE	.02091	.06275	.997	-.1506	.1925
	CE	-.13604	.07247	.331	-.3342	.0621
	COMM	.10135	.07267	.631	-.0973	.3000
	TH	.22952	.13703	.450	-.1451	.6041
CE	EE	.15695*	.05621	.043	.0033	.3106
	ME	.13604	.07247	.331	-.0621	.3342
	COMM	.23738*	.06711	.004	.0539	.4208
	TH	.36555	.13416	.051	-.0012	.7323
COMM	EE	-.08043	.05647	.612	-.2348	.0739
	ME	-.10135	.07267	.631	-.3000	.0973
	CE	-.23738*	.06711	.004	-.4208	-.0539
	TH	.12817	.13427	.875	-.2389	.4952
TH	EE	-.20860	.12916	.488	-.5617	.1445
	ME	-.22952	.13703	.450	-.6041	.1451
	CE	-.36555	.13416	.051	-.7323	.0012
	COMM	-.12817	.13427	.875	-.4952	.2389

Table 12: Test of Homogeneity of Variances for Productivity and Accountability skills

Levene Statistic	df1	df2	Sig.
2.416	4	816	.047

Table 13: ANOVA table for Productivity and Accountability skills

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.048	4	.512	1.485	.205
Within Groups	281.420	816	.345		
Total	283.468	820			

Table 14: Robust Test of Equality of means for Productivity and Accountability

	Statistic[a]	df1	df2	Sig.
Welch	1.835	4	136.124	.126
Brown-Forsythe	1.708	4	448.265	.147

a. Asymptotically F distributed.

*. The mean difference is significant at the 0.05 level.

Table 15: Test of Homogeneity of Variances for Responsibility and Leadershi

Levene Statistic	df1	df2	Sig.
2.418	4	816	.047

p skills

Table 16: ANOVA table for Responsibility and Leadership skills

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.742	4	.935	3.076	.016
Within Groups	248.189	816	.304		
Total	251.931	820			

Table 17: Robust Test of Equality of means for Responsibility and Leadership skills

	Statistic[a]	df1	df2	Sig.
Welch	3.052	4	134.482	.019
Brown-Forsythe	3.367	4	419.575	.010

Asymptotically F distributed.

Table 18: Post-hoc test using Tamhane Multiple Comparisons for Responsibility and Leadership skills

(I) Department code for student	(J) Department code for student	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
EE	ME	.00797	.05601	1.000	-.1506	.1666
	CE	-.06883	.05740	.928	-.2309	.0933
	COMM	.13891	.05142	.071	-.0062	.2840
	TH	.11429	.09375	.931	-.1731	.4017
ME	EE	-.00797	.05601	1.000	-.1666	.1506
	CE	-.07680	.06976	.958	-.2737	.1201
	COMM	.13094	.06492	.368	-.0525	.3143
	TH	.10632	.10179	.973	-.1980	.4106
CE	EE	.06883	.05740	.928	-.0933	.2309
	ME	.07680	.06976	.958	-.1201	.2737
	COMM	.20773*	.06613	.018	.0212	.3942
	TH	.18312	.10256	.578	-.1228	.4890
COMM	EE	-.13891	.05142	.071	-.2840	.0062
	ME	-.13094	.06492	.368	-.3143	.0525
	CE	-.20773*	.06613	.018	-.3942	-.0212
	TH	-.02462	.09933	1.000	-.3234	.2742
TH	EE	-.11429	.09375	.931	-.4017	.1731
	ME	-.10632	.10179	.973	-.4106	.1980
	CE	-.18312	.10256	.578	-.4890	.1228
	COMM	.02462	.09933	1.000	-.2742	.3234

*. The mean difference is significant at the 0.05 level.

V. DISCUSSIONS

The findings for this final research question showed that there was a significant difference between different courses enrolled by students on the flexibility and adaptability skills, initiative and self-direction, and social and cross-cultural skills. Findings also showed that there was no significant difference in the productivity and accountability skills, and responsibility and Leadership skills between courses enrolled by the polytechnic students. This study focused on the departments of the polytechnic students to represent the courses enrolled by the students. From the analysis, there were five departments involved in this study, namely the Electrical Engineering Department (EE), Mechanical Engineering Department (ME), Civil Engineering Department (CE), Department of Commerce (COMM) and Tourism and Hospitality Department (TH).

The findings suggest that students in the five different departments possess no difference in productivity and accountability skills, and responsibility and leadership skills. Meanwhile, students from the five different departments have similarities in terms of Initiative and Self-direction and Social and Cross-cultural skills. Different departments have their ways of embedding their teaching and learning process towards their students. A study conducted by [13], showed that life and career skills had been included by pre-service teachers 75 times in 167 lessons. In the study, the most frequent skills identified were productivity and accountability skills. The other skills identified were flexibility and adaptability skills, which were included 14 times in their lessons, followed by Social and cross-cultural skills and responsibility and leadership skills, which were included 10

times. Initiative and self-direction skills were also included eight times in their lessons. The study showed that pre-service teachers had embedded life and career skills into their lessons to strengthen their students' growth in the 21st century. The study emphasizes that embedding the combination of life and career skills elements in every lesson can help in their students' growth. Therefore, the current study did show that the students in the five departments as identified in this study also possess life and career skills elements through their process of learning in their departments in the polytechnics despite the mean differences in life and career skill elements from each department where the students belong.

VI. CONCLUSIONS

Throughout this study, the findings have proven that TVET students in Premier polytechnic have higher life and career skills compared to students in Conventional and METrO polytechnics. As discussed earlier, this may be due to the initial entry requirements for diploma programs that were different from Premier, Conventional and METrO polytechnics. Premier puts higher requirements than both Conventional and METrO polytechnics. Therefore, it can be concluded that TVET students learning in Premier, Conventional and METrO polytechnics possess different levels of life and career skills even though they study the same diploma courses. Higher education institutions must take into account providing more effort to improve the 21st-century skills of their students to help them in successfully being employed by employers. This study may be used to promote and assist with higher education, specifically polytechnics and industries to improve and enhance TVET programs. Students, as the client should be equipped with ambiguous training and skills to survive in the real working environment. They need to be physically and mentally prepared by embedding life and career skills into their curricular in every program offered in polytechnic. By doing so, students and the polytechnics will both benefit the outcome when their graduates get employed and are in demand from employers. Therefore, to produce a 21st-century workforce, educational institutions must thoroughly understand the 21st-century skills elements, especially life and career skills, and subsequently nurture these skills to produce a workforce of employers' demand. This study can contribute in helping policymakers, program developers and communities to gain information regarding the quality of programs offered; specifically, the Diploma programs in polytechnics since the fact that an estimated 46% of jobs that will be created in the year 2020 require vocational or diploma qualifications as being viewed in the National Graduate Employability blueprint 2012-2017 which was adapted from the Economic Transformation Programme 2010 [14]. This study helps to widen the scope of TVET education by promoting the students' skills that are prepared to face their career and life after completing their studies at the polytechnic. Finally, by profiling the 21st-century life and career skills of polytechnic students in Malaysia, it is hoped that this study can provide insights to decision-makers in the Malaysian Higher Education to minimize the employers' workforce issues and strengthen TVET programs.

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