

Relevance of Technical and Vocational Education and Training in the Employability of Computer Science Graduates

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Abstract: Relevance of Technical and Vocational Education and Training in the Employability of Computer Science Graduates. Objectives: A study was conducted to determine the relevance of Technical Education and Skills Development National Certification in relation to the employment/employability of computer science graduates of Eastern Samar State University, Philippines. **Methods:** A descriptive-correlational design was used and data was analyzed through mean, frequency and percentage distribution. A null hypothesis was tested using Cramer's V association method to determine if there exist a correlation. **Findings:** The results showed that most graduates were employed, a significant number were National Certificate II (NC II) competency test passers, and many considered "not being prepared" as the major hindrance for not taking the said exam. **Conclusion:** the majority of graduates found NC II to be important in securing their current job and Cramer's V score showed strong correlation and rejected the null hypothesis. Based on these findings, it is recommended that efforts to improve graduates' preparation for NC II exams should be continued or even intensified.

Keywords: employability, technical and vocational education, computer science student

Abstrak: Relevansi Pendidikan dan Pelatihan Teknik dan Kejuruan dalam Kemampuan Kerja Lulusan Ilmu Komputer. Tujuan: Sebuah studi dilakukan untuk menentukan relevansi Sertifikasi Nasional Pendidikan Teknis dan Pengembangan Keterampilan dalam kaitannya dengan kemampuan kerja lulusan ilmu komputer dari Eastern Samar State University, Filipina. **Metode:** Desain deskriptif-korelasi digunakan dan data dianalisis melalui rata-rata, frekuensi dan distribusi persentase. **Hipotesis nol** diuji menggunakan metode asosiasi Cramer's V untuk menentukan apakah ada korelasi. **Temuan:** Hasil penelitian menunjukkan bahwa sebagian besar lulusan diterima bekerja, sebagian besar lulus uji kompetensi National Certificate II (NC II), dan banyak yang menganggap "tidak siap" sebagai kendala utama untuk tidak mengikuti ujian tersebut. **Kesimpulan:** Mayoritas lulusan menganggap NC II penting dalam mengamankan pekerjaan mereka saat ini dan skor V Cramer menunjukkan korelasi yang kuat dan menolak hipotesis nol. Berdasarkan temuan tersebut, direkomendasikan agar upaya peningkatan persiapan lulusan menghadapi ujian NC II terus dilanjutkan atau bahkan diintensifkan.

Kata kunci: kemampuan kerja, pendidikan teknik dan vokasi, mahasiswa ilmu komputer.

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■ INTRODUCTION

Employment or employability is one of the areas of concern when it comes to economic development (Subramanian, 2017). Some countries like Cambodia has been working with the Asian Development Bank (ADB) project, to strengthen its Technical Vocational Education and Training (STVET) ' designed to support the government's strategies to achieve socio-economic development for all Cambodians (Paryono. (2017). Both ASEAN (the Association of Southeast Asian Nations) and SEAMEO (the Southeast Asian Ministers of Education have made TVET a top priority agenda. In the Philippines, Omorog (2020) claims that the growing labor market mismatch continues to disturb the country's economic landscape and education is a very important factor to consider. The Marcos administrations according to Ciriaco (2022) intends to revisit and review the country's education curriculum to address skills-job mismatch.

Every year many students march for graduation under the Bachelor of Science in Computer Science Program of Eastern Samar State University College of Computer Studies. Though not mandatory under the said program, students are highly encourage to take the National Skills' Competency Examination (NC II) of the Technical Education and Skills Development Authority (TESDA) of the Philippines for Computer Hardware Servicing. It aims to improve both the student's employability and productivity that is consistent with the demand of the industry (Estecomen, S. Libutaque , P. Libutaque, 2019).

Studies projected that Computer Science and Information Technology graduates are going to be two of the most employable graduates among others due to increasing demand in both the domestic and global labor markets (TESDA, 2011)(Hoffman, 2022). The same projection was shown by Gray (2021) in terms of salary of computer science which was expected to increase by 7.1% due to greater need of technology in the

new virtual world as a result of the Covid19 Pandemic.

However, behind all the positive forecasts, some studies claim that unemployment continues to be a dilemma wherein many graduates remain unemployed and most often than not are compelled to accept material jobs (Subramanian, 2017). The perceived cause of such gap is education-job mismatch since what is being produced in school are graduates with profiles not attractive to the industry. Education-Job Mismatch or Educational Mismatch according to Betti, Neri & D'Agostino (2010) as cited by Lauron et.al (2019) refers to the incoherence of the required educational level for a specific job. Education-job mismatch is sometimes described as over schooling, over education, or surplus education, according to Cohn and Khan (1995) as cited by Veselinoviæ, Mangafiæ, & Turulja, L. (2020). This was evident in the tracer study conducted by Malahay & Saing (2018) wherein majority of the respondents were unemployed and was associated with their academic preparation. It was suggested that the employability of the graduates needs more improvement by evaluating the current curriculum of the Bachelor of Science in Computer Science geared to cater the current and future needs of societies undergoing social and economic change.

Omorog (2020) concur with Orbeta, Gonzales, & Cortes (2016) of their claim that Tertiary education is one of the major culprits for the imbalance in employment supply and demand due to its failure to provide relevant manpower to the demands of the labor market. It is recommended that HEI's create instructional programs and trainings that are timely, relevant, and supported by collaborative and interactive measures to stop the occurrence of job-skill mismatch. The same is suggested by TESDA (2011) that it is necessary for the Philippine education sector to design curriculum aligned with the global standards and the courses must be focused, updated, and accredited and accepted by the industry experts. Gibbons (1998)

describes this as the re-configuration of the concept of educational relevance wherein knowledge production is no longer contained and carried out in relative institutional isolation but with the interaction of other knowledge producers such as TESDA. Schroeder 2019 argued that some employers prefer skills over degrees but it's not skills at the exclusion of degrees. It's just expanding our perspective to go beyond degrees." According to Canadian Tourism Institute, "National Certification with TESDA serves as an added skills credential and proof of competency recognized internationally". TESDA enables the Filipino skilled workforce to be more employable, productive and flexible to the changing requirements of industry and the labor markets, both domestic and overseas. Because of such fluid nature of the requirements of industry pertaining to labor, there is a need for studies that will support the relevance and effectiveness of programs designed to address such need. Hence, this study aims to determine the demographic profile, the number of respondents who took and passed the NC II examination, the number of respondents who were employed from 2015-2019, and the correlation between the number of certifications and the employment of the respondents. Determining the demographic profile in terms of age and sex will provide a better understanding of the respondents' characteristics. The determination of number of respondents who took and passed the NC II examination will highlight the importance of having technical certifications in the current job market. Additionally, determining the number of respondents who were employed from 2015-2019 will provide an insight into the employment trends of the graduates. Finally, the correlation between the number of certifications and employment will assess the impact of certifications on employment. This information will help in understanding the significance of technical certifications in terms of employment and growth.

Hypothesis

Ho : $r \leq 0$ There is no association between respondents' NC II certification and employment

Ha : $r > 0$ There is association between respondents' NC II certification and employment

X : NC II certification

Y : Employment

METHODS

Research Design

A descriptive-correlational design was chosen to investigate the relevance of TESDA's National Certification in Computer Hardware Servicing insofar as the employability of Computer Science graduates in Eastern Samar State University College, Computer Studies from 2016-2019 is concern. This is consistent with research design commonly used in the study of employability such as in the works of CASTRO (2017), Javier, (2015) & Macatangay, (2013)

Respondents and Sampling

The target population for this study were the 117 graduates under the Computer Science program of the College of Computer Studies in Eastern Samar State University from 2016-2019. The sample were selected using convenience sampling method due to the possibility that not all graduates will respond to the inquiry as demonstrated in the study of Kurniawati, E. P., & MeilianaIntani, A. (2016) wherein the sample was determined based on the willingness of the respondents to participate in their study. This research uses 5% error level with 95% confidence level. Number of samples of this research is determined, based on the formula of Slovin (Tejada, J. J., & Punzalan, J. R. B., 2012), namely: $n = N / (1 + Ne^2)$ where n = number of sample N = number of population e = desired limit of accuracy or tolerated limit Based on the above formula, the calculation of number of samples is as follows (using $e = 5\%$): $n = 117 / (1 + 117(0.05)^2) = 90.52$ rounded into 90.

Table 1. Distribution of respondents and its retrieval ratings

SY	Target population	Retrieved Responses	%
2015-2016	22	18	82
2016-2017	40	34	85
2017-2018	21	16	76
2018-2019	33	28	85
Total	117	96	82

The researchers targeted a total of 117 computer science graduates from 2016 - 2019 through social media, and other online platforms (Malahay & Saing, 2018). However, only a total of 96 responses were received constituting only 82% of the entire population but well within the computed number of samples required as shown in Table 1. The response rate is consistent with that of Albina, & Sumagaysay (2020) in their tracer study conducted with computer science graduates with more than 80% retrieval rating.

Data gathering Procedure

A google form was created based on a Survey Instrument used by TESDA in its Impact assessment on the relevance of TVET program in 2011, validated and approved by the National Statistical Coordination Board (NSCB) of the Philippines. Only the questions which provided the needed data directly answering the objective herein set were selected. The author distributed the survey questionnaire online via internet and social media particularly with the use of Facebook, messenger, and email (Malahay & Saing, 2018). Embedded in the questionnaire was the assurance to the responders that the objective was solely educational, and that any information gathered from them would be held in strict confidence. The collected/collated data were automatically converted into an MS Excel file which is one of the convenient features of google form application.

Data Analysis

Descriptive Statistics were used such as mean, frequency and percentage distribution, to describe the data collected in view of the objectives herein specified. The graduate's profile, number of graduates for the period covered, number of graduates who took the National Certification Examination, number of examinee who successfully passed the exam and their employment status in view of NC II certification among others. Relationship between the number of NC II certification within 4 years from 2015-2019 and employment within the same period of the respondents was analyzed using Cramer's V which is a measure of association between two nominal/categorical variables (Akoglu, 2018). Cramer's V can be used as a substitute for the Pearson's correlation coefficient when the variables are not continuous. It ranges from 0 to 1, where 0 indicates no association between the variables, and 1 indicates perfect association

Cramer's V Formula

$$\text{Cramer's } V = \sqrt{\frac{\chi^2}{n \cdot \min(r-1, c-1)}}$$

where:

X²: The Chi-square statistic

n : Total sample size

r : Number of rows

c : Number of columns

Table 2. Scheme of interpretation for cramer's v based on user's guide to correlation coefficients by akoglu, (2018).

> 0.25	Very strong
> 0.15	Strong
> 0.10	Moderate
> 0.05	Weak
> 0	No or very weak

Table 3. Contingency matrix

	Employed	Unemployed	Total
Passed	27	2	29
Failed	5	9	14
Total	32	11	43

■ RESULTS AND DISCUSSION

Table 4. Distribution of respondents by sex and age

SY	Respondents	sex		Age		
		Male	Female	15-24	25-34	35 above
2015-2016	18	13	5	11	5	2
2016-2017	34	27	7	29	3	2
2017-2018	16	9	7	13	3	0
2018-2019	28	18	10	26	2	0
Total	96	67	29	79	13	4

Data collected, treated, and summarized are presented here by the researcher to provide the perspective where answers to the research questions were drawn.

The male graduates outnumber the females at a ratio of 67:29. In terms of percentage share,

69.8% are males and 30.2% females. 82.3% of the graduates are in the 15-to 24-year-old group; 13.5% belong to 25-34 age group; and 4.1% are in the 35 and older group.

Out of the 96 responses, only 43 or 45% indicated to have taken the NC II examination

Table 5. Distribution of respondents in terms of the number who took the examination and the number of those who "Passed" with corresponding passing rate

SY	Respondents	Taken the NC II	Passed	Passing rate %
2015-2016	18	11	8	73
2016-2017	34	16	11	69
2017-2018	16	9	6	67
2018-2019	28	7	4	57
Total	96	43	29	67

and 29 or 67 % indicated to have passed thereof. SY 2015-2016 appeared to have the highest passing percentage of 73% while the lowest in SY 2018-2019 with only 57%. It is notable however that the passing rate in

general from 2016-2019 is only 67% which is remarkably lower than that of the national certification rate of 91% - 94% despite the Covid19 pandemic (TESDA, 2023)

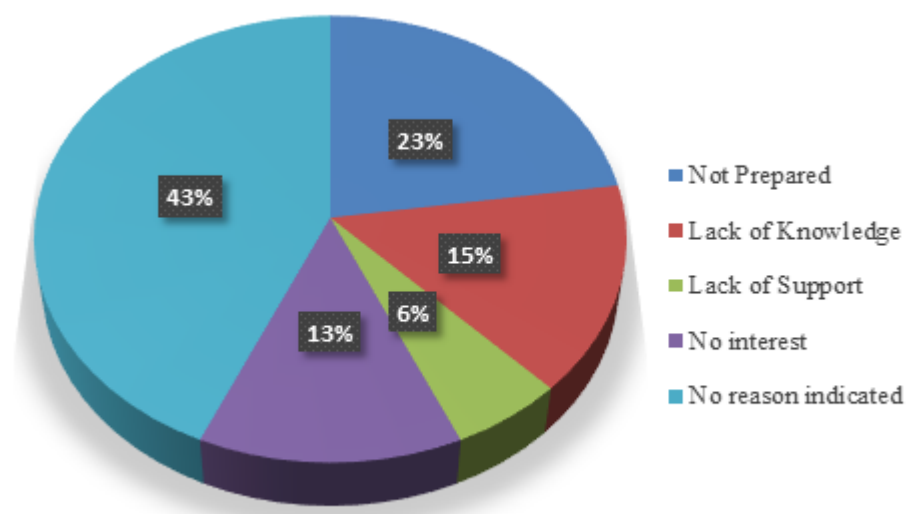


Figure 1. Reason for not taking the Exam

The rest of the 96 respondents who did not take the NC II examination considered “Not being prepared” as the most common reason among the graduates followed by “Lack of Knowledge” and “Support” which is consistent

with the finding of Orbeta, (2021) wherein lack of training was one of the significant reasons for not taking TVET certification. It is however notable the significant number of those who did not indicate their reason of not taking the exam.

Table 6. Employment rate distribution of respondents who took the NC II

SY	Respondents	Passed	Employed	Unemployed	Employment Rate
2015-2016	11	8	7	4	63.6
2016-2017	16	11	11	5	68.8
2017-2018	8	6	5	3	55.6
2018-2019	8	4	4	2	57.1
Total	43	29	29	14	67.4

Table 6 shows that over the four-year period from 2015-2016 to 2018-2019, a total of 43 respondents took the NC II. Of those 43 respondents, 29 were employed and 14 were

unemployed. The highest number of respondents, 16, took the NC II in 2016-2017 11 of which passed, with 11 of those 11 being employed and 5 being unemployed.

The data also shows a general trend of a slightly higher proportion of employed respondents compared to unemployed respondents over the four-year period. This is indicated by the fact that the number of employed respondents exceeds the number of unemployed respondents in every year. On the other hand, the data also suggests that a relatively small number of respondents have taken the NC II over the four-year period, with a slightly higher proportion of employed respondents compared to unemployed respondents. Further research could be conducted to determine the reasons for

this pattern and whether it is reflective of broader trends in employment and education in the relevant population.

Furthermore, the employment rate of the respondents who took the NC II examination can be calculated by dividing the number of employed respondents by the total number of respondents and multiplying by 100. For the period 2015-2019, the employment rate was 67.4% (29 employed respondents / 43 total respondents * 100). This indicates that among the respondents who took the NC II examination, 67.4% were employed, while 32.6% were unemployed.

Table 7. Distribution of respondents as to the duration it took prior to employment

Time taken before employment after the passing of NC II	Employed NC II passer	%
< 1 month	0	0
1 to 3 months	3	10
4 to 6 months	10	34
more than 6 months	7	24
With existing employment	9	31
Total	29	

Table 7 shows the distribution of the employed NC II passers in terms of the duration it took them to find employment after passing the NC II examination. The data shows that 10% of the employed NC II passers found employment within 1 to 3 months, 34% found employment within 4 to 6 months, 24% found employment after more than 6 months, and 31% were already employed when they passed the NC II examination.

It is important to note that this data only represents the employed NC II passers, and does not provide information about the overall employment rate of NC II passers or the general population. The data does suggest that a significant

portion of employed NC II passers found employment within 4 to 6 months after passing the examination.

Table 8. Distribution of respondents as to the usefulness of NC II to Job/Job application

Perceived usefulness NC II	No. of Respondents	%
Very useful	44	46
Some use	23	24
No use	5	5
Did not indicate	24	25
Total	96	

The table shows the distribution of the respondents' perceptions of the usefulness of the NC II certification in terms of job or job application. Out of the 96 respondents, 46% believe that the NC II certification is very useful, 24% believe that it has some use, 5% believe that it has no use, and 25% did not indicate their perception.

These results suggest that a significant majority of the respondents believe that the NC II certification is useful in some way, with 46% perceiving it to be very useful. However, it is also worth noting that a substantial portion of the respondents (25%) did not indicate their

perception, which could indicate a lack of awareness or understanding of the value of the NC II certification.

Correlation

After computing the Cramer's V using an online calculator from Vassarstats.net by VassarStats, (2010) which was used by studies of Suma & Suresh, (2016) about correlation and regression using VASSAR STATS and Cooper, (2022) in using Machine Learning to Identify At-risk Students in an Introductory Programming Course among others. The following results were drawn:

Table 9. Correlation statistical results

chi square	df	p	Cramer's V
13.46	1	0.0002	0.6163

In this case, the chi-square statistic is 13.46, with 1 degree of freedom, and a p-value of 0.0002. The low p-value indicates that the relationship between the two variables is statistically significant, meaning that it is unlikely to be due to chance. The Cramer's V statistic, which measures the strength of the association between the two variables, is 0.6163. According to the interpretation of Cramer's V, a value of 0.6163 indicates a strong association between the variables. This suggests that there is a meaningful relationship between the two variables, and that changes in one variable are likely to be associated with changes in the other variable.

Overall, the results suggest that there is a strong association between the two categorical variables, and this relationship is statistically significant. Further analysis may be needed to determine the nature of the relationship and to determine the causal relationship, if any, between the variables.

CONCLUSIONS

Based on the results and findings herein described, the following conclusions were drawn:

The majority of graduates from the College of Computer Studies for the academic years 2016-2019 who participated in this study are employed. A substantial number of these graduates have also passed the NC II certification examination, which is a testament to their technical skills and knowledge. However, many graduates have reported that a lack of preparedness was the main reason for not taking the NC II examination. Despite this, a majority of the graduates believe that having an NC II certification is crucial in securing and maintaining their current job. The study concludes that there is a strong and statistically significant association between having an NC II certification and employment, thus rejecting the null hypothesis.

RECOMMENDATIONS

This study was intended to assess the relevance or the impact of TESDA NC II in the transition of graduates from academic life to career life since it continue to be their biggest challenge especially that employment conditions are unstable due to many factors affecting it (Gibbons, 1998). In view of herein results and

findings which showed that most of the BSCS graduates of 2016 – 2019 are employed and a substantial part thereof were NC II passers wherein the majority of such employment happened within 4 to 6 months after the certification, it is an affirmation that the encouragement made paid off. It is therefore recommended that efforts geared towards such end especially that which could improve graduates preparations in taking NC II examinations should be continued if not intensified considering that the same was identified to be one of the major hindrances. Universities should make education relevant to professional preparation and academic institutions plays a critical role in this regard (Albrecht and Karabenick, 2018).

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