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TEACHERS' AND STUDENTS' TECHNICAL COMPETENCE IN COMPUTER SYSTEMS SERVICING NC II

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ABSTRACT

The research study aimed to investigate the relationship between teachers' technical competence and students' technical competence in Computer Systems Servicing (CSS) NC II, with the results of the study used as basis for creating an interactive eBook for the Division of La Union. A descriptive-correlational research design was used for the study, with a total of 306 respondents coming from administrators, teachers, and Grade 12 CSS NC II students of selected public senior high schools. The results of the study revealed that teachers possess a very high level of technical competence, and the students also possess a high level of technical competence in all the core competencies of the program. Moreover, the results of the study revealed a very strong and positive significant relationship between teachers' and students' technical competence, indicating that as teachers' technical competence increases, so does the technical competence of the students. The results of the study underscore the significance of teachers' technical competence in the development of students' technical skills in competency-based technical-vocational education. Based on the results, an interactive eBook was developed to support competency-based instruction and enhance the teaching–learning process in Computer Systems Servicing NC II.

Keywords: *Computer Systems Servicing NC II, Technical Competence, Interactive eBook*

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I. INTRODUCTION

1. Introduction

Technical and Vocational Education and Training (TVET) has been recognized for its significance in the development of learners who possess the skills necessary in the contemporary technology-driven workforce. In skills-based programs like the Computer Systems Servicing NC II, the progress of the students' technical skills is an important measure of the effectiveness of the instruction, which can also be related to the students' employability. The enhancement of the skills of TVET learners is beneficial to their employability and the adaptability of the workforce, especially in the fast-paced computer industry (Brolpito et al., 2016; Wagiran et al., 2023).

Teachers are the primary facilitators in the development of skills in technical-vocational learning. The level of teachers' competence is also an important factor that affects the success of the demonstration of concepts, the implementation of activities in the lab, and the students' performance in undertaking hands-on activities. In the learning of system assembly, troubleshooting, networking, and maintenance in CSS NC II, the competence level of the teachers is a crucial factor to consider. Studies revealed that the higher the competence level of the teachers, the higher the learning outcomes of the students in terms of the development of skills in vocational learning (Aligo et al., 2025; Engida, 2024).

In spite of the acknowledged significance of teacher competence, there is a scarcity of empirical studies on the direct relationship between teacher competence and students' technical competence in CSS NC II, especially in the context of public senior high schools in the division level. This underscores the necessity to conduct in-depth studies that investigate the relationship between teachers' and students' technical competence.

Furthermore, the aspect of the integration of digital instructional resources has also received increasing attention as an approach for supporting competency-based instruction in TVET. For instance, interactive digital learning resources such as eBooks have been identified as useful for increasing learner engagement, offering learners structured support, and aiding the development of skills, particularly if they are related to the competency approach (Dogan et al., 2020; Olivar et al., 2024). However, the creation of such learning resources must be based on evidence that is derived from actual teaching-learning contexts, including the competence of teachers and learners.

In the Division of La Union, teachers who handle the CSS NC II program usually use their own developed learning materials because of the non-availability of standardized digital learning materials for the program. Although the initiative of teachers in developing their own learning materials is praiseworthy, the variability of the learning materials in terms of their depth of content and instruction may affect the learning experience of the students. This situation underlines the importance of developing an evidence-based learning resource that could support the teachers in improving the technical skills of the students in an effective way.

Therefore, this study aimed to determine the relationship between teachers' technical competence and students' technical competence in Computer Systems Servicing NC II. The findings of the study served as the basis for developing an interactive eBook that can support competency-based instruction and improve the teaching–learning process in CSS NC II.

Research Questions

This study aimed to determine the relationship between teachers' technical competence and students' technical competence in Computer Systems Servicing NC II.

Specifically, the study sought to answer the following questions:

1. What is the level of technical competence of teachers in Computer Systems Servicing NC II?
2. What is the level of technical competence of students in Computer Systems Servicing NC II?
3. Is there a significant relationship between teachers' technical competence and students' technical competence in Computer Systems Servicing NC II?

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4. What digital learning resource can be developed to support competency-based instruction in Computer Systems Servicing NC II?

METHODS

Research Design

This study used a descriptive correlational research design to investigate the relationship between teachers' technical competence and students' technical competence in Computer Systems Servicing NC II (CSS NC II). The descriptive design was used to establish the level of technical competence of both teachers and students in all the key competency areas of the curriculum of CSS NC II, while the correlational design was used to determine the level of relationship between the two variables.

This design allowed the researcher to describe the existing competence levels of teachers and students and to determine whether a significant relationship exists between them without manipulating the variables involved. Descriptive-correlational designs are commonly used in educational and technical-vocational research to examine naturally occurring relationships among variables and to generate evidence that may inform instructional improvements and program development (Shields & Rangarajan, 2013).

Moreover, the findings of the descriptive and correlational studies also provided the bases for the identification of the needs in the instruction of the CSS NC II program. Furthermore, the findings of the studies were used in the creation of a supplementary digital learning resource in the form of an interactive eBook, which would help in the teaching-learning process in the instruction of the Computer Systems Servicing NC II.

Participants and Sampling

Table 1. Distribution of Respondents

Schools	Students	Teachers	Administrators	Total
Aringay Senior High School	38	1	1	**40**
Bacnotan National High School	53	2	1	**56**
Caba National High School	25	1	1	**27**
Don Eulogio De Guzman Memorial NHS (Bauang)	39	1	1	**41**
Dona Francisca Lacsamana de Ortega Memorial National High School (Bangar)	13	1	1	**15**
Luna National High School	30	1	1	**32**
Naguilian Senior High School	46	2	1	**49**
Sto. Rosario National High School (San Juan)	44	1	1	**46**
TOTAL	**288**	**10**	**8**	**306**

Table 1 shows the distribution of the respondents involved in the research study. The research study was conducted in selected public senior high schools in the two congressional districts of the Schools Division of La Union, with a total of 306 respondents from eight schools. The total number of respondents included 288 Grade 12 students of the computer systems servicing NC II program, 10 teachers of computer systems servicing, and 8 school administrators.

The selection of the schools was made through the application of the random sampling technique, which is referred to as the fishbowl method, ensuring that the selection of the schools was not biased in any way, with some of the selected schools coming from the first district and the rest from the second district, with a total of four large and small classifications, respectively. There were a total of four schools in the first district and another four in the second district.

Students were selected using stratified random sampling to ensure that the sample had proportional representation from the schools that participated in the study. Grade 12 CSS NC II students were the focus of the study to ensure that the students had enough exposure to the competencies and learning experiences that the program could provide. On the other hand, total enumeration was applied in selecting CSS teachers and school administrators

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due to their limited number and their direct involvement in program implementation and instructional supervision.

The participation of the administrators provided another view in judging the technical competency of the teachers, while the CSS teachers were chosen based on their direct involvement in the delivery of the CSS NC II learning curriculum. The participation of the respondents from both big and small schools helped in ensuring the representativeness of the sample, which made the results of the study applicable in other schools in the Division of La Union.

Research Instrument

The data collection instrument used was a validated survey questionnaire that is based on the curriculum guide of the Department of Education and the competency standards of the Technical Education and Skills Development Authority (TESDA) for the CSS NC II program. The instrument was used to measure the technical skills of the teachers and students in terms of the core competencies, computer system configuration, installation of operating systems, computer system troubleshooting, computer network cabling, and system maintenance.

Teachers' technical competence was assessed using administrator, self, and student ratings, while students' technical competence was assessed using teacher and self-ratings. Mean scores were computed to represent the overall level of technical competence for both teachers and students.

Content validity of the instrument was established through expert validation of specialists in technical-vocational education and in educational research. The validation process was done to ensure the clarity, relevance, and appropriateness of the items in terms of the competencies being measured (Oducado, 2020). Revisions were made in the instrument according to the validators' recommendations prior to the administration.

Data Collection Procedure

Permission to conduct the study was secured from the Schools Division Office of La Union. Ethical considerations were observed in the entire process. Informed consent was secured from the respondents prior to the conduct of the study.

The survey instrument prepared for the research was patterned based on the competencies set in the curriculum guide of the Department of Education and the training regulations set by the Technical Education and Skills Development Authority (TESDA) for the Computer Systems Servicing NC II program. The survey instrument was also subjected to content validation by using the Survey Instrument Validation Rating Scale developed by Oducado (2020) before conducting the actual survey.

The questionnaire was implemented through a paper-and-pencil approach to ensure its accessibility and comparability across the schools that participated in the study. The collection of the data was done during the scheduled school visit to ensure that there was minimal interference with the normal school activities. The questionnaires were collected immediately after the implementation.

Data Analysis

The data was organized, coded, and analyzed using appropriate statistical tools. Descriptive statistics, frequency counts, percentages, and mean scores were employed to describe the level of technical competence of the teachers and the students.

Prior to inferential analysis, a test of normality was conducted. Since the data did not meet the assumption of normality, Spearman's rho correlation was used to determine the relationship between teachers' technical competence and students' technical competence. Spearman's rho is appropriate for ordinal data and non-normally distributed variables. The level of significance was set at $\alpha = .05$.

RESULTS AND DISCUSSION

Level of Technical Competence of Teachers

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Table 2. Level of Technical Competence of Teachers

Technical Competencies for Computer Systems Servicing NCII	Administrator	Self	Students	Mean	DE
Assemble computer hardware	4.54	4.69	4.13	4.45	VHC
Prepare installer	4.38	4.70	4.07	4.38	VHC
Install operating system and drivers for peripherals/ devices	4.60	4.70	4.04	4.45	VHC
Install application software	4.50	4.70	4.10	4.43	VHC
Conduct testing and documentation	4.31	4.70	4.09	4.37	VHC
Install network cables	4.56	4.70	4.08	4.45	VHC
Set network configuration	4.48	4.70	4.09	4.42	VHC
Set router/wi-fi/wireless access point/repeater configuration	4.50	4.70	4.08	4.43	VHC
Inspect and test the configured computer networks	4.48	4.70	4.11	4.43	VHC
Overall Mean	**4.48**	**4.70**	**4.09**	**4.42**	**VHC**

The level of technical competence of the teachers who managed the computer systems servicing NC II course is shown in Table 2. The results indicated that the teachers demonstrated a very high level of technical competence, with a mean of 4.42. High ratings were observed for all competency areas, such as assembling computer hardware, installing operating systems and application software, and configuring networks, as well as testing and documentation.

Among these areas of competence, the findings showed that the mean of 4.45 in the areas of Assemble Computer Hardware, Install Operating System and Drivers for Peripherals and Devices, and Install Network Cables was rated as Very Highly Competent (VHC). This is an indication of the teachers' competence in dealing with the basic installation of computer hardware, which is the basis of the CSS NC II curriculum. In the same way, the findings showed that the mean in the areas of Install Application Software, Set Router/Wi-Fi/Wireless Access Point/Repeater Configuration, and Inspect and Test the Configured Computer Networks ranged from 4.43 to 4.45, rated as Very Highly Competent (VHC).

The other competencies, such as Prepare Installer (4.38), Conduct Testing and Documentation (4.37), and Set Network Configuration (4.42), were also rated Very Highly Competent (VHC). The results indicate that teachers are competent not only in performing the tasks but also in ensuring quality and safety standards are met.

Overall, the findings validated the teachers' advanced level of technical competence in all nine competency domains of the CSS NC II, with all domains scoring a Very Highly Competent (VHC) level. This is a good basis for the implementation of competency-based learning in CSS NC II, particularly since it has recently been verified in international studies on TVET that teachers in practice-oriented technical fields show a high level of competence in integrating pedagogical concepts with content knowledge, which is a critical factor in supporting student learning in technical skills-based programs (Zarate et al., 2025).

Level of Technical Competence of Students

Table 3. Level of technical competence of students

Technical Competencies for Computer Systems Servicing NCII	Teacher	Self	Mean	DE
Assemble computer hardware	4.61	3.46	4.03	HC
Prepare installer	4.57	3.45	4.01	HC
Install operating system and drivers for peripherals/ devices	4.60	3.39	3.99	HC
Install application software	4.60	3.47	4.03	HC
Conduct testing and documentation	4.60	3.45	4.02	HC
Install network cables	4.59	3.43	4.01	HC
Set network configuration	4.58	3.40	3.99	HC

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Set router/wi-fi/wireless access point/repeater configuration	4.60	3.34	3.97	HC
Inspect and test the configured computer networks	4.60	3.38	3.99	HC
Overall Mean	**4.59**	**3.42**	**4.01**	**HC**

Table 3 shows the level of technical competence of the students who enrolled in the CSS NC II program. From the results, the students have shown high technical competence, as indicated by the high mean value of 4.01. The students have shown that they have the capacity to perform the basic functions, which include assembling computer hardware, installing operating systems, installing application software, making installers, and setting up network configurations.

All the mean ratings for the nine competency domains are under the Highly Competent (HC) range, reflecting consistency in the technical competency of the students. Competencies such as Assemble Computer Hardware (4.03), Install Application Software (4.03), Prepare Installer (4.01), and Install Network Cables (4.01) show the competency of the students in performing basic computer functions such as assembling computer hardware, installing application software, preparing installers, and performing basic network cabling, among others. The results show that learners have already developed the essential technical skills to perform the operation of CSS NC II. This is in line with the study of vocational education, which asserts that "vocational education students tend to develop competencies related to their vocational track, closely associated with the needs of industries, especially when learning is focused on 'practical and hands-on' approaches" (Oroh et al., 2023).

Slightly lower, though still high, mean scores were recorded for Install Operating System and Drivers for Peripherals and Devices (3.99), Set Network Configuration (3.99), Set Router/Wi-Fi/Wireless Access Point/Repeater Configuration (3.97), and Inspect and Test the Configured Computer Networks (3.99). These skills involve more intricate processes which include troubleshooting, optimization, and verification, and therefore require higher levels of analysis, which involve extensive practice. From the findings, it is revealed that though the students are able to execute the skills, they would still find it challenging when faced with unexpected technical situations.

It is worth noting that, overall, ratings by teachers for all areas surpass students' ratings, which show that students underrate their abilities. This might be attributed to lack of confidence and not lack of ability, which underscores the significance of learning support that enables learners to go through procedures on their own.

Overall, the results confirm that students possess strong foundational competence in CSS NC II, but they may benefit from structured learning support that reinforces complex procedures, enhances confidence, and promotes independent skill development. These results also support the idea that supplementary learning materials, such as learning guides, can be beneficial for students, which can help improve their skills beyond the classroom.

Relationship Between Teachers' and Students' Technical Competence

Table 4. Relationship between teachers' and students' technical competence

Variables	Spearman's ρ	Sig. (2-tailed)	N	Interpretation
Teachers' technical competence and students' technical competence	.915**	< .01	10	Very strong positive

Note. *ρ = Spearman's rho. ** p < .01.*

Table 4 shows the result obtained from the Spearman's rho correlation analysis that was conducted to establish the relationship that exists between teachers' technical skills and students' technical skills. The results revealed a very strong and statistically significant positive relationship between the two variables (ρ = .915, p < .01).

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This outcome, therefore, shows that there is a positive relationship between teachers' and students' technical competence in Computer Systems Servicing NC II. The strong association between teachers' and students' technical competence in this study could be explained by the nature of the Computer Systems Servicing NC II, which includes the demonstration of procedures, practice, and hands-on activities in the laboratory. Teachers with high technical competence are in a position to guide the students in the laboratory and in the demonstration of procedures, which are essential in the development of students' technical competence.

The findings of this study are in accordance with the findings of earlier studies that underscore the importance of teacher competence in terms of its impact on the learning outcomes of students in technical-vocational education. Previous studies have revealed that the mastery of teachers in terms of their knowledge in the subject matter is an important factor that contributes to the development of students' competencies in the field of technical-vocational education (Aligo & Prudente, 2025; Engida et al., 2024). In addition, Wagiran et al. (2023) pointed out that the role of teachers in the delivery of technical knowledge is essential in the achievement of students' employability skills.

The strong relationship identified in this study also has important implications for instructional support in CSS NC II. Since teachers' technical expertise plays a central role in students' skill development, instructional resources that reinforce effective teaching practices may further enhance learning outcomes. In this study, the established relationship was used as a basis in the conceptualization of an interactive eBook that would facilitate competency-based learning in Computer Systems Servicing NC II. The interactive eBook, which would provide a learning platform that would guide the learning process, would be instrumental in assisting teachers in the effective delivery of technical learning.

Overall, the results underscore the need to enhance teachers' technical competency as a means of enhancing the technical competency of their students in CSS NC II. Professional development programs, upgrading of skills, and the incorporation of conducive digital learning tools may all play a role in the effective delivery of technical-vocational learning and academic achievement.

CONCLUSION

Based on the findings of the study, teachers handling Computer Systems Servicing NC II were observed to possess a very high level of technical competence, while the students were observed to possess a high level of technical competence in the core competencies of the program. These findings of the study reveal that teachers and students possess the necessary technical skills for the effective implementation of competency-based instruction in CSS NC II. However, the consistently higher competence levels of teachers in handling the technical skills of the students reveal their critical role in the learning and skill development of the students in technical-vocational education.

Moreover, the study revealed that there exists a very strong positive relationship, which is statistically significant, between teachers' technical competency and students' technical competency. This suggests that the level of teachers' technical competency is significantly related to the technical competency of the students. This, therefore, confirms the significance of teachers' technical competency in helping the students acquire technical competency.

Overall, the results highlight the importance of continuously developing teachers' technical competence. In addition, the results provide support in the creation of learning materials, such as the interactive eBook, which could potentially help in the promotion of competency-based teaching and the teaching-learning process in Computer Systems Servicing NC II.

RECOMMENDATIONS

Based on the findings and conclusions of the study, the following recommendations are proposed:

1. Teachers who handle the Computer Systems Servicing NC II program must continually improve their technical skills through skills upgrading, training, and participation in other related activities to improve the technical skills of the students.
2. School administrators may provide support to CSS NC II teachers by facilitating technical training opportunities and encouraging the use of instructional resources that reinforce competency-based teaching.
3. Curriculum developers and instructional designers may use the results of this study as basis for developing learning materials, such as interactive

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digital learning materials, for teachers and for the improvement of the technical competency of students.

4. Future researchers may conduct similar studies to investigate other factors affecting the technical competency of students or assess the efficacy of instructional innovations for the improvement of learning outcomes in CSS NC II.

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