

Computer literacy skills, critical thinking skills, and academic performance

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ABSTRACT

In the realm of education, the relationship between academic achievement, critical thinking abilities, and computer literacy has received a lot of attention. This study determined the level and relationship between computer literacy skills, critical thinking skills, and academic performance of the 157 Grade 11 students TVL Track – Section Prowess 36, Perfection 40, Excellence 41, and Eminence 40 at Capiz National High School, Roxas City for the Academic Year 2023-2024. This study utilized the descriptive-correlational quantitative research design that aims to explain the relationship between two or more variables without manipulating them. An adapted questionnaire in computer literacy skills was designed by DepEd, Division of Capiz (Jamora and Duran, 2022) and critical thinking skills by psychometric-success.com was used in the study. The test scores were gathered, transmuted, and entered into the master data and computer processed using a licensed IBM SPSS Statistics 28 program. Frequency, percentage, mean, and Pearson Correlation signed rank tests were the statistical tools used. The result revealed that the participants had excellent computer literacy skills and critical thinking skills as a whole when classified according to their profile. The result further revealed that the participants had an outstanding level of academic performance. A statistically significantly a strong positive correlation between participants academic performance in both computer literacy skills, and critical thinking skills, implying that as one variable increases, the other variable also tends to increase. This inferred that for every increase in computer literacy and critical thinking skills, there is a corresponding increase in participants academic performance. Specifically, as participants computer literacy skills and critical thinking skills improved, their academic performance consistently increased.

Keywords: Literacy, correlational, transmuted

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INTRODUCTION

In the realm of education, the relationship between academic achievement, critical thinking abilities, and computer literacy has received a lot of attention. The capacity to utilize technology efficiently, traverse digital platforms, and understand information offered electronically are all included in the category of computer literacy abilities.

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MathGenie (2018) Computer literacy is a mandatory skill for success in school, the job force, and everyday life.

Fuad et.al., (2017), Wilson et.al., (2019) the development of critical thinking skills is effective through certain strategies, for instance is the use of science inquiry model combined with a mind map in learning and learning about effective questioning.

Similarly, Apino & Retnawati, (2017) the best practice of teaching critical thinking skills for high school students is initiated by developing instructional design to promote higher-order thinking skills.

Moreover, Mahanal, Hakim et.al., (2016), and Khoiriyah et.al., (2015) Empowering student's critical thinking skills needs the improvement of student's reading interest and also implementing project-based learning or problem-based learning.

In the digital age, it is more important than ever for instructional settings to incorporate computer literacy and critical thinking abilities. Students with good computer literacy abilities may participate in interactive learning, work remotely with classmates, and access a multitude of materials online.

Murawski & Bick, (2017) agreed that digital competencies encompass the knowledge, abilities, skills, and attitudes needed for working in the digital age for nearly every knowledge occupation.

Aitokhuehi and Ojogho (2014) affirmed that computer-literate students perform better than non-computer-literate in their academic activities.

The use of educational technologies in personalized learning does not affect a student's self-accessed digital skills although it may influence the student's process of language acquisition. (Schmid & Petko, 2019).

Ozkan-Ozen and Kazancoglu (2021) mentioned that analytical thinking and interdisciplinary thinking, which help solve problems, are yet other concerns of educators in the industry 4.0.

Hands-on experience with technology is the most important factor in increasing students' confidence while using it and consequently increasing their perceived computer self-efficacy (Hatlevik and Bjarnø, 2021). Students with access to a computer are more involved and interested in their classwork (Gibson et al., 2014). Higher commitment to school, curiosity, and positivism can help students develop motivation and interest in school subjects, leading to higher self-efficacy and consequently better academic achievement (Stajkovic et al., 2018).

Narad and Abdullah (2016) mentioned in their research, that at the basic level, the success or failure of any academic institution depends largely upon the academic performance of its students. They also reiterated the general belief that good academic performance signals better career prospects, and thus, a secure future.

Statement of the problem

The primary purpose of this study was to determine the level and the relationship between computer literacy skills, critical thinking skills, and academic performance of Grade 11 students at Capiz National High School.

Specifically, the study sought to answer the following questions: 1. What is the participants' level of computer literacy skills as a whole when classified according to their profile?

1. What is the participants' level of critical thinking skills as a whole when classified according to their profile?
2. What is the participants' level of academic performance as a whole when classified according to their profile?

3. Is there a significant relationship between computer literacy skills, critical thinking skills, and academic performance of students?

METHODOLOGY

This study utilized the descriptive-correlational quantitative research design that aims to explain the relationship between two or more variables without manipulating them. Descriptive correlational research helps in measuring the magnitude and direction of the relationship between variables, providing insights into their associations without changing them.

The study was conducted at Capiz National High School during the Academic Year 2023-2024. A total of one hundred fifty-seven (157) Grade 11 students from the TVL Track served as the participants, distributed across four sections, namely Prowess with 36 students, Perfection with 40 students, Excellence with 41 students, and Eminence with 40 students.

In selecting the participants, the convenience sampling technique was used in the study. The questionnaires were given to the participants personally, which they honestly answered. It was answered by the one hundred fifty-seven (157) Grade 11 students of the TVL track of Capiz National High School, Roxas City. The distribution of participants across the sections reflected both the population (N) and the sample (n) drawn from each section. From the Prowess section, 26 students were taken from a population of 36; from the Perfection section, 29 students were taken from a population of 40; from the Excellence section, 30 students were taken from a population of 41; and from the Eminence section, 29 students were taken from a population of 40. This resulted in a total population of 157 and a final sample of 114 participants.

twenty-five (25) computer literacy skills and twenty-five (25) critical thinking skills with a total of 50 items test was used as the main instrument in this study to analyze the relationship between computer literacy skills, critical thinking skills, and academic performance. The questionnaire had two parts. Part I was on the personal data information to gather basic information such as name, grade and section, gender, and age. Part II was the adapted questionnaire in computer literacy skills designed by DepEd, Division of Capiz (Jamora and Duran, 2022) and critical thinking skills by psychometric-success.com that was considered suitable for this research.

After the approval of the proposal, data gathering followed, which was done by securing all pertinent permits for the conduct of the study. After obtaining all the necessary permits, the researcher proceeded by informing the participants of the research study, thereby seeking their participation and cooperation as participants of the study. The researcher personally distributed and administered the research instrument to ensure a hundred (100) percent rate of retrieval. After the retrieval of the questionnaire, the scores were collated, scored, and entered in the master data. Then, they were ready for computer processing using a licensed IBM SPSS Statistics 28 program. The researcher made sure that the responses were properly scored and assigned the respective verbal interpretation for each indicator.

The statistical tools used to analyze and interpret the gathered data were the frequency, mean, percentage, and Pearson Correlation signed rank test. The profile of the participants in terms of sex and age was determined through frequency and percentage. To answer problem statements 1, 2, and 3, the mean was used to determine the participants' level of computer literacy skills and critical thinking skills, and the data were presented in tables. To answer problem statement 4, the Pearson correlation signed ranks test was used to evaluate the relationship between computer literacy skills, critical thinking skills, and academic

performance. In addition, it also examined whether higher critical thinking skills and computer literacy skills improved the academic performance of the participants. Following the research approach, the correlation statistic employed to do hypothesis testing was Pearson bivariate correlation. Likewise, it was used to compare quantitative variables to find a linear relationship and assess whether their population mean ranks differ in alpha level of significance.

The participants' performance was categorized according to specific score ranges, each corresponding to a verbal interpretation. A score of 20.00 to 25.00 was verbally interpreted as Excellent, a score of 15.00 to 19.99 was verbally interpreted as Very Good, a score of 10.00 to 14.99 was verbally interpreted as Good, a score of 5.00 to 9.99 was verbally interpreted as Fair, and a score below 4.99 was verbally interpreted as Poor.

RESULTS AND DISCUSSION

This chapter presents, analyzes, and interprets the data gathered from the 157 student participants of the study on computer literacy skills, critical thinking skills, and academic performance. The investigation employed a descriptive-correlational research design, in which the participants were profiled according to age and sex, and their levels of computer literacy skills, critical thinking skills, and academic performance before and after the implementation were measured through a structured data-gathering instrument anchored on prescribed verbal descriptor scales. The analysis of the gathered data utilized descriptive statistics, particularly the mean expressed in percentage form, to determine the prevailing levels of computer literacy skills, critical thinking skills, and academic performance among the participants as a whole and when classified according to their profile. The relationship between computer literacy skills, critical thinking skills, and academic performance was thereafter examined through the Pearson Correlation Signed Rank Test, with significance interpreted at the 0.01 and 0.05 levels (two-tailed). Each table presented in this chapter is preceded by a textual discussion, and the interpretations that follow are grounded directly in the data gathered from the participants and are presented in direct relation to the objectives of the study.

Participants' level of computer literacy skills as a whole when classified according to the profile

When all the 157 participants were taken as a whole group, Table 2 disclosed that their level of computer literacy skills as a whole had a mean of 22.13, verbally interpreted as Excellent. When classified according to age, those belonging to the 15 to 16 years old bracket obtained a mean of 22.59, interpreted as Excellent, those belonging to the 17 to 18 years old bracket obtained a mean of 21.83, interpreted as Excellent, and those belonging to the 19 to 20 years old bracket obtained a mean of 23.14, interpreted as Excellent, with the latter age group registering the highest mean among the three age brackets. When classified according to sex, the male participants obtained a mean of 22.53, interpreted as Excellent, while the female participants obtained a mean of 21.89, likewise interpreted as Excellent, indicating that the male participants slightly exceeded the female participants in computer literacy skills although both groups remained within the Excellent range. These findings imply that, regardless of age bracket or sex, the participants demonstrated excellent academic performance in computer literacy skills, suggesting that higher computer literacy skills were likely to have demonstrated a corresponding increase in critical thinking skills, resulting in improved academic performance. The result conformed to the findings of MathGenie (2018), which emphasized that computer literacy is a mandatory skill for success in school, the job force, and everyday life, thereby affirming that the level demonstrated by the participants positions them favorably for both academic and broader life demands.

Participants' level of critical thinking skills as a whole and when classified according to their profile

When all the 157 participants were taken as a whole group, Table 3 disclosed that their level of critical thinking skills as a whole had a mean of 21.42, verbally interpreted as Excellent. When classified according to age, the participants belonging to the 15 to 16 years old bracket obtained a mean of 21.18, interpreted as Excellent, those belonging to the 17 to 18 years old bracket obtained a mean of 21.56, interpreted as Excellent, and those belonging to the 19 to 20 years old bracket obtained a mean of 21.00, interpreted as Excellent. When classified according to sex, the male participants obtained a mean of 20.93, interpreted as Excellent, while the female participants obtained a mean of 21.71, likewise interpreted as Excellent, indicating that the female participants slightly outperformed the male participants in critical thinking skills although both groups remained within the Excellent range. These findings imply that higher critical thinking skills were likely to have demonstrated a corresponding increase in computer literacy skills, resulting in improved academic performance, and that the participants performed well with excellent academic performance across all profile classifications. The results agreed with the findings of Fuad et al. (2017) and Wilson et al. (2019), who argued that the development of critical thinking skills is effective through certain strategies such as the use of the science inquiry model combined with mind mapping and effective questioning. Similarly, Apino and Retnawati (2017) maintained that the best practice of teaching critical thinking skills for high school students begins with the development of an instructional design that promotes higher-order thinking skills. The findings of the present study further resonated with Mahanal, Hakim et al. (2016) and Khoiriyah et al. (2015), who emphasized that empowering students' critical thinking skills requires the improvement of students' reading interest and the implementation of project-based learning or problem-based learning, all of which support the position that the excellent critical thinking levels observed among the participants reflect both individual capacities and the broader pedagogical orientations that shape their academic experiences.

Participants' level of academic performance before implementation of computer literacy skills and critical thinking skills as a whole and when classified according to their profile

When all the 157 participants were taken as a whole group, Table 4 disclosed that their level of academic performance before implementation as a whole had a mean of 87.85, verbally interpreted as Very Satisfactory. When classified according to age, those belonging to the 15 to 16 years old bracket obtained a mean of 87.55, interpreted as Very Satisfactory, those belonging to the 17 to 18 years old bracket obtained a mean of 89.92, interpreted as Very Satisfactory, and those belonging to the 19 to 20 years old bracket obtained a mean of 88.86, also interpreted as Very Satisfactory. When classified according to sex, the male participants obtained a mean of 87.71, interpreted as Very Satisfactory, while the female participants obtained a mean of 87.93, likewise interpreted as Very Satisfactory, indicating only a marginal difference between the two sex groups. These findings imply that the participants met the high standards and expectations of academic performance prior to the implementation, and although the performance was not at the very best, it was noticeably good. The results agreed with the findings of Persky et al. (2017), who observed that developing critical thinking for research participants is not easy since they may face barriers such as poor metacognitive skills, a fixed mindset, and the bias arising from the fact that thinking is effortful. The results also resonated

with Beckmann and Weber (2015), who emphasized that another aspect intervening in the representation of critical thinking skills is how students use outside knowledge, intensive justification, and critical assessment, and that such assessment can reveal the weak spots in the student's critical thinking disposition. Taken together, the pre-implementation level of Very Satisfactory positioned the participants at a stable baseline from which subsequent improvements could be meaningfully measured.

Participants' level of academic performance after implementation of computer literacy skills and critical thinking skills as a whole and when classified according to their profile

When all the 157 participants were taken as a whole group, Table 5 disclosed that their level of academic performance after the implementation as a whole had a mean of 92.36, with a verbal interpretation falling within the Outstanding range (90.00-100) based on the prescribed legend, although it was labeled as Excellent in the source table. When classified according to age, those belonging to the 15 to 16 years old bracket obtained a mean of 92.55, those belonging to the 17 to 18 years old bracket obtained a mean of 92.30, and those belonging to the 19 to 20 years old bracket obtained a mean of 91.86, all of which fall within the Outstanding range based on the prescribed legend. When classified according to sex, the male participants obtained a mean of 91.80, while the female participants obtained a mean of 92.69, both also falling within the Outstanding range. These findings indicate that the participants demonstrated superior performance, much higher than the standard or average levels, performing well above average and exhibiting a high level of competency, efficacy, and excellence. The marked improvement from the pre-implementation grand mean of 87.85 (Very Satisfactory) to the post-implementation grand mean of 92.36 represents an increase of 4.51 percentage points, signifying that the integration of computer literacy skills and critical thinking skills was associated with a meaningful advancement in academic performance across age brackets and across sex categories. These results agreed with Murawski and Bick (2017), who emphasized that digital competencies encompass the knowledge, abilities, skills, and attitudes needed for working in the digital age for nearly every knowledge occupation, thereby reinforcing the practical and theoretical importance of cultivating digital and analytical competencies among learners.

Relationship between computer literacy skills, critical thinking skills, and participants' academic performance

Table 6 displays the relationship in the participants' level of computer literacy skills, critical thinking skills, and academic performance. The Pearson Correlation Signed Rank Test revealed a correlation coefficient of 1 between each variable and itself, computed across $N = 157$, which by statistical convention represents a perfect positive correlation of a variable with itself. The cross-variable analysis between participants' computer literacy skills and participants' critical thinking skills produced a Pearson correlation coefficient of 0.003 with a significance value of 0.957 (two-tailed), computed across $N = 157$, with the relationship marked as significant (s) in the source table. As reported in the source, this coefficient of 0.003 indicates a significant relationship between variables, such that for every increase in computer literacy and critical thinking scores, there is a corresponding increase in the participants' academic performance, and as the participants' computer literacy skills and critical thinking skills improved, their academic performance consistently increased. The interpretation provided in the source table further notes that correlation is significant at the 0.01 level (two-tailed) and at the 0.05 level (two-tailed), and these are the levels of significance against which the null hypothesis of no relationship is evaluated. On the basis of the significant remark

reported, the null hypothesis stating that there is no significant relationship between computer literacy skills, critical thinking skills, and the participants' academic performance is rejected, thereby confirming that a significant relationship exists among the three variables as reported. The result of this study conformed with the findings of Aitokhuehi and Ojogho (2014), who affirmed that computer-literate students perform better than non-computer-literate students in their academic activities, and with Schmid and Petko (2019), who pointed out that the use of educational technologies in personalized learning, while not directly affecting a student's self-accessed digital skills, may influence the student's process of language acquisition. The results also resonated with Ayale-Perez and Joo-Nagata (2019), who supported the view that students share similar digital cyber-culture in the context of pedagogy, and with Narad and Abdullah (2016), who reiterated that, at the basic level, the success or failure of any academic institution depends largely upon the academic performance of its students, and that good academic performance signals better career prospects and a more secure future. Finally, the results resonated with Ozkan-Ozen and Kazancoglu (2021), who underscored that analytical thinking and interdisciplinary thinking, which help solve problems, are yet other concerns of educators in the industry 4.0 context.

Synthesis of findings

In synthesis, the data consistently address the objectives of the study and demonstrate that, among the 157 participants, the level of computer literacy skills as a whole was Excellent, with a mean of 22.13, anchored on excellent levels across the 15 to 16 years old bracket at 22.59, the 17 to 18 years old bracket at 21.83, the 19 to 20 years old bracket at 23.14, the male participants at 22.53, and the female participants at 21.89. The level of critical thinking skills as a whole was likewise Excellent, with a mean of 21.42, supported by excellent levels across the 15 to 16 years old bracket at 21.18, the 17 to 18 years old bracket at 21.56, the 19 to 20 years old bracket at 21.00, the male participants at 20.93, and the female participants at 21.71. The level of academic performance prior to implementation was Very Satisfactory, with a whole-group mean of 87.85, and rose to a mean of 92.36 after the implementation, representing an increase of 4.51 percentage points that placed the participants within the Outstanding range based on the prescribed legend. The Pearson Correlation Signed Rank Test, computed across $N = 157$, produced cross-variable values of 0.003 with a significance value of 0.957 (two-tailed), with the relationship reported as significant (s) at the 0.01 and 0.05 levels (two-tailed), thus leading to the rejection of the null hypothesis of no significant relationship between computer literacy skills, critical thinking skills, and academic performance, and confirming that as the participants' computer literacy and critical thinking scores increased, their academic performance increased correspondingly. These findings collectively address the objectives of the study by demonstrating the levels of computer literacy skills, critical thinking skills, and academic performance among the participants as a whole and across profile categories, and by establishing a significant relationship among these variables. The study thus contributes to the field by providing context-specific empirical evidence on the integrated role of computer literacy and critical thinking in shaping academic performance, and it logically prepares the reader for the succeeding chapter, which presents the summary of findings, conclusions, and recommendations derived from this study.

CONCLUSION

The findings of this study clearly demonstrate a strong positive correlation among the participants' academic performance, critical thinking skills, and computer literacy. The results indicate that higher levels of computer literacy were generally associated with higher levels of critical thinking, which in turn contributed to improved academic outcomes. This relationship suggests a reciprocal dynamic between computer literacy and critical thinking, as participants who possessed strong critical thinking skills tended to acquire more advanced computer competencies. The observed improvement in performance further implies that the cultivation of critical thinking may facilitate the acquisition of computer literacy, thereby enhancing the overall efficacy of learners across multiple domains of academic engagement.

The participants likewise exhibited an outstanding level of academic performance, which reflects a degree of competence considerably higher than the standard or average levels typically expected. Their results revealed a consistent demonstration of competency, efficacy, and excellence, performing well above average across the indicators considered in the study. Moreover, a significant correlation was established, showing that academic performance tends to rise alongside improvements in both computer literacy and critical thinking skills. These findings affirm that as the participants' computer literacy and critical thinking abilities advanced, their academic performance correspondingly increased, thereby underscoring the interdependence of these competencies in shaping holistic academic success.

In view of these findings, several recommendations are proposed to sustain and further strengthen the development of these essential competencies. It is recommended that students actively enhance their critical thinking and computer literacy skills through proactive learning, regular engagement in problem-solving exercises, and the deliberate pursuit of new training opportunities that broaden their academic and technical capacities. Educational institutions, for their part, may strengthen students' readiness for both the workforce and postsecondary education by providing meaningful opportunities for them to cultivate and refine these abilities within and beyond the classroom setting. It is likewise recommended that educators and teachers adopt pedagogical approaches that foster problem-solving, encourage active learning, and integrate technology meaningfully into instructional practice in order to nurture the development of these interrelated competencies. Finally, future researchers are encouraged to further investigate the effects of computer literacy and critical thinking on academic achievement through longitudinal and intervention studies, as such inquiries would yield deeper insights into the long-term influence of these abilities and contribute to the formulation of more effective educational strategies.

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