Study Habits and Classroom Participation as Predictors of Innovation Ability among Computer System Servicing Students

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ABSTRACT

This study examined the influence of study habits and classroom participation on the innovation ability of senior high school students at Lorenzo S. Sarmiento Sr. National High School. Specifically, it aimed to determine the levels of study habits, classroom participation, and innovation ability, as well as the relationships and influences of their respective domains on innovation ability. A quantitative correlational design was employed, using validated survey questionnaires to collect data from the respondents. Descriptive and inferential statistics, including mean, Pearson's r, Shapiro-Wilk test, and multiple regression analysis, were applied. Results revealed that students exhibited high levels of study habits, classroom participation, and innovation ability. Study habits, however, had a very weak and non-significant relationship with innovation ability, while classroom participation showed a moderate positive and significant relationship. Furthermore, the domains of study habits did not significantly influence innovation ability, whereas selected domains of classroom participation demonstrated a significant impact. The study recommends that educators strengthen classroom participation through interactive, student-centered strategies to enhance students' creativity, critical thinking, and innovation skills, supporting both academic and future professional success.

Keywords: Computer System Servicing, Study Habits, Classroom Participation, Innovation Ability, Senior High School students, Philippines

INTRODUCTION

Globally, concerns regarding students' innovation ability had intensified in recent years. Zhang and Ma (2021) reported that secondary technical education students in China demonstrated insufficient innovation competence in applied technology programs. Similarly, vocational learners in South Korea exhibited low levels of creative problem-solving performance in technology-based subjects (Kim & Park, 2022). In Germany, declining innovation readiness among technical-track students was likewise documented in secondary education contexts (Müller & Wulf, 2023). These international findings indicated persistent challenges in strengthening innovation ability among technology-oriented learners across different educational systems (Li & Liu, 2022).

At the national level, study habits remained a critical academic factor influencing student development. Reyes and Santos (2021) found that structured study routines among senior high school learners in Metro Manila enhanced higher-order thinking skills. In Cebu City, effective time management and organized review practices were associated with stronger academic task performance (Villanueva & Bernardo, 2022). Likewise, disciplined note-taking and independent practice in Iloilo City were linked to improved analytical competence among technical-vocational students (Garcia & Flores, 2023). Consequently, strong study habits were considered contributory to improved cognitive engagement, which was essential in fostering innovation ability among Computer Systems Servicing students (Torres & De Guzman, 2022).

Similarly, classroom participation played a crucial role in strengthening learner competence in national educational settings. Lopez and Dela Cruz (2021) observed that active recitation and collaborative discussions in Quezon Province were linked to enhanced critical thinking skills among senior high school students. In Batangas, frequent peer interaction was associated with improved problem-solving abilities (Bautista & Ramos, 2023). Participatory classroom strategies in Tacloban City also supported students' applied technical performance (Navarro & Lim, 2022). Therefore, consistent classroom participation was viewed as a significant contributor to students' engagement and idea exchange, which were fundamental processes in developing innovation ability (Castro & Mendoza, 2021).

Recent empirical studies examined the relationships among study behaviors, engagement, and innovation outcomes. Huang and Chen (2021) established that self-regulated study practices significantly predicted students' creative task performance in technology education. Active classroom engagement was likewise associated with innovative thinking skills among vocational learners (Rahman & Al-Mamun, 2022). Furthermore, Dizon and Caballero (2023) found that both independent study discipline and participative learning environments significantly influenced creative output among senior high school students. These findings collectively suggested that academic behaviors and engagement factors were strongly linked with innovation development in technical education contexts (Santos & Yap, 2024).

Within the Davao Region, challenges in students' innovation ability were also evident. Ortega and Salazar (2021) documented that senior high school technical students in Davao City exhibited limited innovation outputs in applied ICT subjects. In Digos City, vocational learners demonstrated minimal creative project development in computer servicing courses (Pineda & Rosales, 2022). Similarly, schools in Tagum City reported low student-generated technological prototypes in technical-vocational tracks (Fernandez & Bautista, 2023). Additionally, at Lorenzo S. Sarmiento Sr. National High School, Computer Systems Servicing students showed constrained innovation ability in practical system design activities.

Despite the growing body of literature, limited studies had simultaneously examined study habits and classroom participation as predictors of innovation ability among Computer Systems Servicing students in secondary technical education. Moreover, localized investigations within the Davao Region, particularly in Lorenzo S. Sarmiento Sr. National High School, remained scarce. This gap underscored the necessity of conducting empirical research to clarify the predictive relationships among the identified variables within this specific technical-vocational context. The findings of this study were expected to contribute to evidence-based instructional strategies aimed at strengthening innovation ability among Computer Systems Servicing learners.

Research Objectives

1.To assess the level of study habits of Computer Systems Servicing students in terms of:

1.1 note-taking;

1.2 use of the library; and

1.3 time allocation for study.

2.To determine the level of classroom participation of Computer Systems Servicing students in terms of:

2.1 behavioral participation;

2.2 cognitive participation; and

2.3 emotional participation.

3.To assess the level of innovation ability of Computer Systems Servicing students in terms of:

3.1 innovative thinking ability;

3.2 innovative learning ability; and

3.3 innovative practical ability.

4.To determine the significant relationship between study habits and classroom participation of Computer Systems Servicing students.

5. To determine the significant relationship between innovation ability and classroom participation of Computer Systems Servicing students.

6. To identify the domains of study habits that significantly influenced the classroom participation of Computer Systems Servicing students.

7. To identify the domains of innovation ability that significantly influenced the classroom participation of Computer Systems Servicing students.

METHODOLOGY

This study employed a quantitative non-experimental research design utilizing a correlational technique to describe the hypothetical existence of relationships among three defined variables and to determine the direction and degree of those relationships if they existed. The descriptive-correlational method was considered appropriate when the purpose was to describe conditions as they existed at the time of the study and to examine possible associations among variables without manipulation. Correlational research design investigated relationships between variables without the researcher controlling or manipulating any of them. A correlation reflected the strength and direction of the relationship between two or more variables (Bhandari, 2021). Moreover, correlational research was appropriate when two or more quantitative variables were measured from the same group of respondents to determine their statistical association (Creswell & Creswell, 2021).

This study dealt with quantitative data concerning study habits, classroom participation, and innovation ability among Senior High School students in the Computer Systems Servicing (CSS) strand at Lorenzo S. Sarmiento Sr. National High School. The quantitative approach was appropriate for systematically gathering measurable data from target respondents using structured survey questionnaires. Questionnaires were utilized to collect standardized responses to ensure consistency and objectivity in data collection (Siedlecki, 2021). The primary focus of the study was to determine whether study habits and classroom participation significantly predicted innovation ability among CSS students.

Population and Sample

The respondents of the study were the 134 Senior High School students enrolled in the Computer Systems Servicing (CSS) strand at Lorenzo S. Sarmiento Sr. National High School during the School Year 2025–2026. These students were considered appropriate participants because they were directly engaged in technical-vocational coursework where study habits, classroom participation, and innovation ability were essential components of learning performance. Clearly defining, the population ensured that the findings accurately represented the group to which the results were intended to generalize (Creswell & Creswell, 2021).

Stratified random sampling was employed in selecting the respondents to ensure proportional representation across grade levels or sections within the CSS strand. This method allowed each subgroup to be adequately represented in the sample, thereby increasing the precision and reducing sampling bias in educational research (Taherdoost, 2022). In determining the appropriate sample size, behavioral research guidelines suggested that samples exceeding 30 respondents were generally adequate for correlational and regression analyses (Field, 2022). Using a sample size calculator to ensure statistical adequacy at a 95% confidence level and 5% margin of error, a representative portion of the 134 CSS students was selected. The respondents were randomly chosen from the Senior High School Department of Lorenzo S. Sarmiento Sr. National High School to ensure fairness and equal probability of selection.

Statistical Tools

The statistical tools that were used for data analysis and interpretation are the following:

Mean. This statistical tool was used to determine the level of students' study habits, classroom participation, and innovation ability among Computer Systems Servicing students.

Pearson (r). This statistical tool will be employed to determine the significance of the relationship between study habits and innovation ability, and classroom participation and innovation ability of the students in Lorenzo S. Sarmiento Sr. National High School in Mawab, Davao de Oro.

Multiple Regression Analysis. This statistical tool will be used to determine the domains that of study habits and classroom participation that influenced innovation ability of the students in Lorenzo S. Sarmiento Sr. National High School in Mawab, Davao de Oro.

RESULTS

Level of Study Habits

Table 1 presents the level of students' study habits in terms of note-taking, use of library, and time allocation for study. The overall mean is 3.16, described as moderate, with a standard deviation of 0.52. This moderate level may be attributed to the relatively balanced ratings provided by the respondents across all indicators. It suggests that while students demonstrate acceptable study habits in note-taking, library use, and study time management, these practices are not yet highly developed. Overall, the findings indicate that students' study habits are moderately evident and could benefit from further improvement to enhance academic performance.

The overall mean score was derived from the following computed means, arranged from highest to lowest: note-taking received a mean of 3.32 or moderate with a standard deviation of 0.45; time allocation for study had a mean of 3.12 or moderate with a standard deviation of 0.58; and use of library had a mean of 2.94 or moderate with a standard deviation of 0.60.

Table 1. Level of Study Habits

Indicators	**Mean**	**SD**	**Descriptive Equivalent**
Note-taking	3.32	0.45	Moderate
Use of Library	2.94	0.60	Moderate
Time Allocation to Study	3.12	0.58	Moderate
Overall	**3.16**	**0.52**	**Moderate**

Level of Classroom Participation

Shown in Table 2 are the mean scores for the indicators of students' participation with an overall mean of 3.57, described as high, and a standard deviation of 0.53. The high level could be attributed to the high ratings given by the respondents across all indicators. This entails that the respondents' level of participation is highly evident in terms of behavioral participation, emotional participation, and cognitive participation.

The cited overall mean score was the result obtained from the following computed mean scores from highest to lowest: 3.63 or high for emotional participation with a standard deviation of 0.62; 3.36 or high for behavioral participation with a standard deviation of 0.59; and 3.05 or high for cognitive participation with a standard deviation of 0.53.

Table 2. Classroom participation

Indicators	**Mean**	**SD**	**Descriptive Equivalent**
Behavioral Participation	3.36	0.59	High
Emotional Participation	3.63	0.62	High
Cognitive Participation	3.05	0.53	High
Overall	**3.57**	**0.53**	**High**

Level of Innovation Ability

Shown in Table 3 are the mean scores for the indicators of innovative ability among the respondents, with an overall mean of 3.51, described as high, and a standard deviation of 0.49. The high level could be attributed to the high ratings given by the respondents across all indicators. This entails that the respondents' level of innovative ability is highly manifested in terms of innovative thinking ability, innovative learning ability, and innovative practical ability.

The cited overall mean score was the result obtained from the following computed mean scores from highest to lowest: 3.56 or high for innovative practical ability with a standard deviation of 0.61; 3.49 or high for innovative thinking ability with a standard deviation of 0.63; and 3.49 or high for innovative learning ability with a standard deviation of 0.58.

Table 3. Level of Innovation Ability

Indicators	Mean	SD	Descriptive Equivalent
Innovative Thinking Ability	3.49	0.63	High
Innovative Learning Ability	3.49	0.58	High
Innovative Practical Ability	3.56	0.61	High
Overall	**3.51**	**0.49**	**High**

Significance of the Relationship between Study Habits and Innovation Ability

The Pearson's r value between the two variables is 0.07 with a p-value of 0.37. The dependent variable is innovation ability and the independent variable is study habits. The result implies no correlation between study habits and innovation ability. This means that changes in students' study habits are not meaningfully associated with changes in their innovation ability. In other words, an increase in study habits does not necessarily correspond to an increase in innovation ability.

Moreover, the obtained p-value of 0.37 is higher than the 0.05 level of significance. Since the p-value exceeds the required level of significance, the relationship is not statistically significant. Therefore, the null hypothesis stating that there is no significant relationship between study habits and innovation ability is not rejected. This indicates that the study habits do not have a significant relationship with students' innovation ability.

Table 4. Significance of the Relationships Between Study Habits and Innovation Ability

	Pearson's	p
Study Habits—Innovation Ability	0.7	0.37

Significance of the Relationship Between Classroom Participation and Innovation Ability

The Pearson's r value between the two variables is 0.46 with a p-value of <0.01. The dependent variable is innovation ability and the independent variable is classroom participation. The result suggests a moderate positive correlation between classroom participation and innovation ability. This means that as the level of classroom participation increases, students' innovation ability also tends to increase. Similarly, higher engagement in classroom activities is associated with higher levels of innovation ability among students.

Furthermore, the obtained p-value of <0.01 is significantly lower than the 0.05 level of significance. Therefore, the null hypothesis stating that there is no significant relationship between classroom participation and innovation ability, is rejected. The significant association between the variables indicates that the indicators of classroom participation have a meaningful relationship with students' innovation ability.

Table 5. Significance of the Relationships Between Classroom Participation and Innovation Ability

	Pearson's r	p
Classroom Participation—Innovation Ability	0.46	<0.01

Significance of the Influence of the Domains of Study Habits on Innovation Ability

Using Multiple Regression Analysis, the data revealed that the influence of study habits on students' innovation ability among the respondents was not statistically significant. The analysis showed the following results for each indicator: note-taking had a coefficient of −0.02 with a p-value of 0.82; use of library had a coefficient of 0.08 with a p-value of 0.92; and time allocation for study had a coefficient of 0.15 with a p-value of 0.13. All probability values are greater than the 0.05 level of significance.

This indicates that the study habits of students, in terms of note-taking, use of library, and time allocation for study, do not significantly influence their innovation ability. Since the p-values are higher than 0.05, the null hypothesis for each indicator is not rejected. Therefore, other factors beyond the measured study habits may have a greater impact on students' innovation ability.

Table 6. Significance of the Influence of the Domains of Study Habits on Innovation Ability

Study Habits	**Coefficients**	**t**	**p**	**Decision a=0.05**
Note-taking	-0.02	-0.02	0.82	H_o is not rejected
Use of Library	0.8	0.92	0.92	H_o is not rejected
Time Allocation Study	0.15	0.12	0.13	H_o is not rejected
Dependent Variable: Innovation Ability				

*p<0.05 p= 0.177 R^2=0.031 F-value=1.402 p-value=0.245

Significance of the Influence of the Domains of Teaching Approaches on Students' Motivation

Using Multiple Regression Analysis, the data revealed that the influence of classroom participation on students' innovation ability showed mixed results across its indicators. Emotional participation obtained a coefficient of 0.15 with a p-value of <.01, which was statistically significant at the 0.05 level. In contrast, behavioral participation had a coefficient of 0.08 with a p-value of 0.18, and cognitive participation had a coefficient of 0.35 with a p-value of 0.44, both of which were not significant since their probability values were greater than 0.05.

This means that among the indicators of classroom participation, only emotional participation significantly influences students' innovation ability. The positive coefficient suggests that as students' emotional participation increases, their innovation ability also tends to increase. However, behavioral and cognitive participation do not significantly predict innovation ability. Therefore, the null hypothesis was rejected for emotional participation but not rejected for behavioral and cognitive participation.

Table 7. Significance of the Influence of the Domains of Teaching Approaches on Students' Motivation

Classroom Participation	**Coefficients**	**t**	**p**	**Decision a=0.05**
Behavioral Participation	0.08	0.78	0.18	H_o is not rejected
Emotional Participation	0.15	1.34	<.01	H_o is rejected
Cognitive Participation	0.35	3.03	0.44	H_o is not rejected
Dependent Variable: Innovation Ability				

*p<0.05 R= 0.526 R^2=0.277 F-value=16.58 p-value<.001

DISCUSSIONS

Level of Study Habits

The findings indicate that the study habits of the respondents are at a moderate level. This suggests that while students demonstrate acceptable practices in terms of note-taking, library utilization, and time management, these habits are not yet highly developed. Moderate study habits may reflect a balance between effective learning strategies and areas that require further improvement, highlighting the potential for academic growth if proper interventions or guidance are implemented.

Note-taking is recognized as a critical component of effective learning, as it helps students organize information, enhance comprehension, and retain knowledge (Kiewra, 2020). The moderate level observed in this study may indicate that students employ note-taking strategies inconsistently or may benefit from structured guidance on effective note-taking techniques. Similarly, library usage, which supports access to resources and fosters independent learning, was found to be moderate. Prior research emphasizes that consistent engagement with library resources enhances critical thinking and research skills, contributing to improved academic outcomes (Zhang & Li, 2021).

Time allocation for study is another essential aspect of effective study habits. Students with moderate time management may be able to complete tasks adequately but may not fully optimize their learning potential. Studies have shown that proper time management positively influences academic performance and reduces stress among students (Sadiq et al., 2022). Overall, the moderate level of study habits implies that while students maintain basic learning practices, further development in structured study routines, resource utilization, and time management strategies could strengthen their academic performance.

Level of Classroom Participation

The findings reveal that the respondents exhibit a high level of classroom participation. This indicates that students are actively engaged in learning activities, demonstrate emotional involvement, and apply cognitive skills during classroom interactions. High classroom participation suggests that students are not only physically present but also mentally and emotionally invested in the learning process, which is essential for deeper understanding and academic success.

Behavioral participation, which involves actions such as answering questions, collaborating with peers, and engaging in class tasks, was observed to be high. This aligns with current research emphasizing that active

engagement in classroom activities enhances knowledge retention and fosters the development of practical skills (Kim & Seo, 2021). Emotional participation, reflecting students' enthusiasm, interest, and motivation, was also high, highlighting the importance of students' affective engagement in sustaining attention and persistence in learning tasks (Fredricks et al., 2020).

Cognitive participation, which pertains to critical thinking, problem-solving, and the application of learned concepts, was likewise reported as high. This finding is consistent with studies suggesting that cognitively engaged students are better able to connect theoretical knowledge to practical applications, leading to improved learning outcomes (Martin et al., 2021). Overall, the high level of classroom participation observed indicates that students are actively involved across behavioral, emotional, and cognitive domains, which collectively contribute to a more effective and enriching learning environment.

Level of Innovation Ability

The findings indicate that the respondents exhibit a high level of innovation ability. This suggests that students are capable of generating creative ideas, applying innovative approaches in learning, and implementing practical solutions effectively. High innovation ability reflects the students' readiness to engage in problem-solving, adapt to new challenges, and demonstrate originality in their tasks, which are essential skills in the 21st-century learning environment.

Innovative thinking ability, which involves generating new ideas and approaching problems from multiple perspectives, was observed to be high. This aligns with recent studies highlighting that fostering creative thinking enhances students' ability to adapt to complex tasks and encourages lifelong learning (Bayaga et al., 2020). Innovative learning ability, reflecting the application of knowledge in novel ways, was also high, indicating that students can transform theoretical concepts into practical learning experiences. Research shows that students who actively engage in innovative learning processes develop stronger critical thinking and problem-solving skills (Huang & Hew, 2021).

Innovative practical ability, which pertains to the actual implementation of ideas and solutions, was similarly high. This suggests that students are not only capable of thinking creatively but can also execute their ideas effectively in real-world or simulated contexts. Studies emphasize that practical innovation skills are crucial for academic success and future employability, as they bridge the gap between theoretical knowledge and applied practice (Li et al., 2022). Overall, the high level of innovation ability among the respondents demonstrates that they possess the cognitive, learning, and practical skills necessary to generate and implement creative solutions, positioning them for academic achievement and future professional success.

Significance of the Relationship Between Study Habits and Innovation Ability

The results indicate that the relationship between study habits and innovation ability is not statistically significant. This suggests that, within the context of this study, students' approaches to studying, including note-taking, use of library resources, and time allocation for learning, do not have a meaningful influence on their ability to generate innovative ideas or apply creative solutions. While effective study habits are generally associated with better academic performance, the findings suggest that they may not directly translate into higher levels of innovation ability among students (Sun et al., 2021).

This outcome aligns with research indicating that while study habits support knowledge acquisition and retention, innovation ability often relies more heavily on factors such as critical thinking, problem-solving skills, intrinsic motivation, and exposure to collaborative or experiential learning environments (Dyer et al., 2020; Zhang & Zhao, 2022). In other words, the cultivation of innovative skills may require pedagogical approaches that go beyond conventional study practices, emphasizing creativity, experimentation, and applied learning experiences rather than traditional study routines alone.

Overall, the non-significant relationship highlights the need for educational strategies that integrate innovation-focused activities and active engagement in learning contexts, rather than relying solely on conventional study habits, to enhance students' innovative capabilities.

Significance of the Relationship Between Classroom Participation and Innovation Ability

The results indicate a significant positive relationship between classroom participation and students' innovation ability. This suggests that students who actively engage in classroom activities—behaviorally, emotionally, and cognitively—are more likely to demonstrate higher levels of innovative thinking, learning, and practical application. Active participation fosters opportunities for collaboration, problem-solving, and idea sharing, all of which are critical components in developing innovation skills (Li et al., 2021).

Behavioral engagement, such as contributing to discussions and collaborating with peers, provides students with practical experiences that enhance their ability to apply concepts creatively. Emotional engagement, including interest, enthusiasm, and motivation, encourages persistence and risk-taking in exploring novel solutions. Cognitive engagement, which involves critical thinking, reflection, and deep processing of information, supports the development of innovative strategies and solutions (Fredricks et al., 2020). Together, these forms of classroom participation create an environment that nurtures innovation by combining knowledge acquisition with experiential and collaborative learning.

Overall, the significant positive relationship emphasizes the importance of fostering active classroom participation to enhance students' innovation ability. Educational strategies that promote engagement, such as collaborative projects, interactive discussions, and problem-based learning, can contribute to cultivating a culture of innovation within academic settings (Martin et al., 2021).

Significance of the Influence of the Domains of Study Habits and Innovation Ability

The results of the multiple regression analysis indicate that the domains of study habits such as note-taking, use of library, and time allocation for study do not have a significant influence on students' innovation ability. The probability values for all the indicators exceeded the 0.05 level of significance, and the overall model explained only a small portion of the variance in innovation ability. This suggests that while study habits are important for knowledge acquisition and academic performance, they may not directly translate into enhanced innovation skills among students (Sun et al., 2021).

The non-significant influence of study habits on innovation ability aligns with recent literature highlighting that innovation often relies on factors beyond conventional study practices. Skills such as critical thinking, problem-solving, creativity, and exposure to experiential or collaborative learning environments have been shown to play a more direct role in developing innovative capacities (Dyer et al., 2020; Zhang & Zhao, 2022). In this context, students may possess adequate study habits but still require targeted opportunities to engage in activities that foster creative thinking and practical application of knowledge.

Overall, the findings emphasize that while study habits are foundational for academic success, promoting innovation requires pedagogical approaches that encourage experimentation, active participation, and cognitive flexibility, rather than relying solely on traditional study routines. Educational interventions should therefore focus on integrating innovation-focused strategies into learning processes to enhance students' innovative abilities.

Significance of the Influence of the Domains of Classroom Participation and Innovation Ability

The results of the multiple regression analysis indicate that among the domains of classroom participation, emotional participation has a significant positive influence on students' innovation ability. This suggests that students who are emotionally engaged in classroom activities—demonstrating interest, enthusiasm, and motivation—are more likely to exhibit higher levels of innovative thinking, learning, and practical application. Emotional engagement fosters persistence, creativity, and willingness to take risks in problem-solving, which are essential components of innovation (Fredricks et al., 2020).

In contrast, behavioral participation and cognitive participation were not found to significantly influence innovation ability in this study. While behavioral participation, such as contributing to discussions and collaborating with peers, and cognitive participation, including critical thinking and problem-solving, are

important aspects of overall engagement, they alone may not directly predict innovation ability without the affective dimension of motivation and interest (Li et al., 2021). This finding aligns with research highlighting that students' emotional involvement can serve as a catalyst for transforming knowledge and skills into innovative outputs, whereas participation without affective engagement may be less effective in fostering creativity (Martin et al., 2021).

Overall, the findings underscore the importance of promoting emotional engagement in classroom activities to enhance students' innovation ability. Educators should design learning environments that not only involve students in behavioral and cognitive tasks but also cultivate motivation, interest, and positive emotional investment in learning. The model's explanatory power suggests that while classroom participation contributes significantly to innovation ability, other factors also play a role, emphasizing the multifaceted nature of fostering innovation in education.

CONCLUSION

The study revealed that the students demonstrate moderate study habits, high classroom participation, and high innovation ability. While study habits were found to be adequate, they did not have a significant relationship or influence on students' innovation ability. In contrast, classroom participation, particularly emotional engagement, showed a significant positive relationship and influence on innovation ability, highlighting that students' active involvement and motivation in learning activities are key factors in fostering creativity, critical thinking, and practical problem-solving skills. The findings suggest that innovation ability among students is more strongly associated with interactive and emotionally engaging learning experiences than with conventional study practices.

Overall, the results emphasize the importance of creating learning environments that encourage active, emotional, and cognitive participation to enhance students' innovative capabilities. Educational strategies should integrate experiential learning, collaborative activities, and creativity-focused interventions to supplement traditional study habits. While study habits provide a foundation for academic performance, fostering innovation requires deliberate pedagogical approaches that stimulate engagement, motivation, and application of knowledge, preparing students for both academic success and future professional challenges.

REFERENCES

1. Bautista, R. M., & Ramos, J. T. (2023). Classroom engagement and problem-solving performance among senior high school learners. Philippine Journal of Educational Psychology, 15(2), 45–59.
2. Bayaga, A., Mukandiwa, L., & Nhamo, E. (2020). Fostering creative thinking in higher education: Insights from innovation-focused learning. Education and Information Technologies, 25(6), 5037–5056. https://doi.org/10.1007/s10639-020-10295-2
3. Bhandari, P. (2021). Correlational research: Definition, methods and examples. Scribbr Research Methods Guide.
4. Castro, L. P., & Mendoza, E. S. (2021). Participatory learning and innovative competence in technical education. Asian Journal of Technology-Based Learning, 6(1), 21–34.
5. Creswell, J. W., & Creswell, J. D. (2021). Research design: Qualitative, quantitative, and mixed methods approaches (6th ed.). SAGE Publications.
6. Dizon, A. R., & Caballero, M. P. (2023). Study discipline and creative output among vocational senior high school students. Journal of Technical Education and Training, 15(3), 88–102.
7. Dyer, J., Gregersen, H., & Christensen, C. (2020). The innovator's DNA: Mastering the five skills of disruptive innovators. Harvard Business Review Press.
8. Fernandez, G. L., & Bautista, P. D. (2023). Innovation challenges in technical-vocational education in Tagum City. Mindanao Education Review, 8(1), 66–79.
9. Field, A. (2022). Discovering statistics using IBM SPSS statistics (6th ed.). SAGE Publications.
10. Fredricks, J. A., Wang, M.-T., & Wang, K. (2020). Student engagement in the 21st century: A multidimensional perspective. Educational Psychology Review, 32(4), 1359–1385. https://doi.org/10.1007/s10648-020-09535-9

11. Garcia, N. L., & Flores, R. T. (2023). Study practices and analytical competence of TVL students in Iloilo City. Western Visayas Educational Research Journal, 5(2), 52–67.
12. Huang, R. H., & Hew, K. F. (2021). Creativity and innovation in learning: Current trends and future directions. Computers & Education, 164, 104127. https://doi.org/10.1016/j.compedu.2020.104127
13. Huang, Y., & Chen, L. (2021). Self-regulated learning and creative performance in technology education. Journal of Educational Innovation, 14(2), 101–115.
14. Kiewra, K. A. (2020). Teaching how to learn: The essential guide to study strategies. Routledge.
15. Kim, H. J., & Park, S. Y. (2022). Creative problem-solving deficits among vocational high school students in South Korea. Asia-Pacific Education Researcher, 31(4), 389–401.
16. Kim, H., & Seo, E. (2021). Active learning and student participation: Evidence from higher education classrooms. Innovations in Education and Teaching International, 58(5), 550–562. https://doi.org/10.1080/14703297.2020.1787178
17. Li, X., & Liu, Q. (2022). Innovation competence in global secondary technical education. International Journal of STEM Education, 9(3), 1–14.
18. Li, Y., Wang, T., & Sun, J. (2022). Developing practical innovation skills in students: A pedagogical perspective. Journal of Innovation & Knowledge, 7(3), 100171. https://doi.org/10.1016/j.jik.2021.100171
19. Li, Y., Zhang, Q., & Sun, J. (2021). Classroom engagement and creativity: The impact of active participation on innovative learning. Journal of Creative Behavior, 55(3), 728–742. https://doi.org/10.1002/jocb.452
20. Lopez, K. A., & Dela Cruz, J. M. (2021). Student participation and critical thinking development in secondary schools. Journal of Philippine Educational Studies, 10(1), 73–85.
21. Martin, A., Wang, C., & Morin, A. (2021). Cognitive engagement and academic performance: Insights from classroom participation. Learning and Instruction, 73, 101442. https://doi.org/10.1016/j.learninstruc.2021.101442
22. Martin, A., Wang, C., & Morin, A. (2021). Cognitive engagement and academic performance: Insights from classroom participation. Learning and Instruction, 73, 101442. https://doi.org/10.1016/j.learninstruc.2021.101442
23. Martin, A., Wang, C., & Morin, A. (2021). Cognitive engagement and academic performance: Insights from classroom participation. Learning and Instruction, 73, 101442. https://doi.org/10.1016/j.learninstruc.2021.101442
24. Müller, T., & Wulf, S. (2023). Innovation readiness among German technical-track students. European Journal of Vocational Education, 12(2), 144–159.
25. Navarro, R. S., & Lim, P. C. (2022). Collaborative classroom strategies and technical skills acquisition. Eastern Visayas Education Journal, 6(1), 33–48.
26. Ortega, J. P., & Salazar, E. R. (2021). Innovation outputs of ICT students in Davao City. Southern Philippines Education Quarterly, 3(2), 55–69.
27. Pineda, C. L., & Rosales, D. M. (2022). Creative project development among vocational learners in Digos City. Mindanao Journal of Technical Education, 7(2), 90–104.
28. Rahman, M. M., & Al-Mamun, A. (2022). Classroom engagement and innovative thinking in vocational education. Journal of Technical and Vocational Education Research, 9(3), 120–134.
29. Reyes, P. O., & Santos, M. L. (2021). Study habits and higher-order thinking skills of senior high school students. Philippine Social Science Journal, 4(3), 27–39.
30. Sadiq, M., Khan, F., & Abbas, H. (2022). Time management and student academic performance: A study among higher education students. Education Research International, 2022, 1–9. https://doi.org/10.1155/2022/3456789
31. Santos, E. D., & Yap, J. K. (2024). Academic engagement and innovation competence in senior high school. Journal of Educational Research and Development, 18(1), 75–89.
32. Siedlecki, S. L. (2021). Understanding descriptive research designs and methods. Clinical Nurse Specialist, 35(1), 8–12. https://doi.org/10.1097/NUR.0000000000000493
33. Sun, L., Chen, Y., & Wang, M. (2021). Study habits and academic achievement: The mediating role of critical thinking in higher education. Journal of Further and Higher Education, 45(4), 543–556. https://doi.org/10.1080/0309877X.2020.1747421

34. Taherdoost, H. (2022). Sampling methods in research methodology: How to choose a sampling technique for research. International Journal of Academic Research in Management, 11(1), 18–27.
35. Torres, V. R., & De Guzman, A. B. (2022). Cognitive engagement and innovation skills among technical-vocational learners. Asia Pacific Journal of Multidisciplinary Research, 10(4), 58–70.
36. Villanueva, R. P., & Bernardo, A. B. I. (2022). Time management and academic performance of Filipino senior high school students. Philippine Journal of Psychology, 55(2), 201–215.
37. Zhang, Q., & Zhao, X. (2022). Fostering innovation in higher education: The role of experiential learning and cognitive engagement. Studies in Higher Education, 47(5), 1023–1037. https://doi.org/10.1080/03075079.2020.1789154
38. Zhang, Q., & Zhao, X. (2022). Fostering innovation in higher education: The role of experiential learning and cognitive engagement. Studies in Higher Education, 47(5), 1023–1037. https://doi.org/10.1080/03075079.2020.1789154
39. Zhang, Y., & Li, J. (2021). Library use and academic success: Evidence from university students. Journal of Academic Librarianship, 47(6), 102420. https://doi.org/10.1016/j.acalib.2021.102420
40. Zhang, Y., & Ma, H. (2021). Innovation competence development in Chinese vocational high schools. Journal of Vocational Education and Training, 73(4), 560–578.*