

FACILITATION OF STUDENT ACADEMIC ENGAGEMENT AND COMPUTATIONAL THINKING SKILL OF STUDENTS

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Abstract: This study is aimed to find out the relationship between facilitation of student academic engagement and computational thinking skill of student. This study utilized the non-experimental quantitative research design using descriptive technique involving teachers in Davao Occidental Division, Philippines. The study was conducted on the second semester of School Year 2025-2026. Research instruments on student academic engagement and computational thinking skill of student were used as source of data. Using mean and pearson-r as statistical tools to treat the data, the study showed the following results: The study found to exhibit a high level of facilitation of student academic engagement. This means that the provisions relating to facilitation of student academic engagement is oftentimes observed. The study revealed a high level of computational thinking skill of students. This indicates that the provisions relating to computational thinking skill of students are embodied in the item is oftentimes observed. The results of the study also confirm that there is a significant relationship between facilitation of student academic engagement and computational thinking skill of students. This implies that the higher the facilitation of student academic engagement, the higher is the computational thinking skill of students. Thus, the null hypothesis of no significant relationship between facilitation of student academic engagement and computational thinking skill of student was rejected.

Keywords: student academic engagement, computational thinking skill of student, school administration and supervision, quantitative research.

I. INTRODUCTION

The computational thinking skill of students is increasingly recognized as a vital competency in today's technology-driven world. It refers to the ability to break down complex problems, recognize patterns, create algorithms, and think logically in order to develop effective solutions, skills that are foundational not just in computer science, but across all academic disciplines. However, many educational systems face a problem situation where students lack strong computational thinking skills, resulting in a gap between what is needed for modern careers and what is being taught in schools (Polat, Hopcan, Kucuk & Sisman, 2021).

The issue on low student computational thinking skills among the students is widely evident in the United States. The data suggest that in the 2023 assessment, U.S. eighth-graders scored below the international average in computational thinking. It is recorded that their average CT score was 461, compared to the international average of 483. Additionally, the U.S. saw

a notable decline from its 2018 score of 498, a drop of 37 points. In the similar context, the U.S. also had a higher proportion of students scoring below Level 1 (15%) than the international average (10%), indicating a notable share of students with very limited computational thinking skills (Tekdal, 2021).

In the Philippines, finding Philippines-specific data on students' computational thinking (CT) skills from global assessments like PISA is challenging because such direct measurements are scarce. However, several insights and related data help illuminate the state of CT, particularly through clues in creative thinking, digital literacy, and educational infrastructure. While PISA's creative thinking assessment is not identical to computing-based CT, it shares cognitive overlaps like problem decomposition, ideation, and algorithmic-like reasoning which results pointed that the country scored second-lowest among 64 countries for creative thinking, with a mean of 14 points versus the global average of 33. This stark gap suggests weak capacity in the higher-order, structured thinking associated with computational thinking (Smith, Voigt & Zhang, 2021).

In the local setting, teachers point out that the digital divide and unequal access to technology further widen the gap in students' computational thinking development. Students in under-resourced schools or communities may not have access to computers, internet connectivity, or software tools that allow them to practice coding, modeling, or problem decomposition. This creates inequities in learning opportunities and disadvantages students who are already at risk of being left behind in a technology-dependent society.

This study seeks to underscore the relationship between facilitation of student academic engagement and computational thinking skill of students to ascertain the relationship between the two variables. Today, the researcher has rarely come across with a study on the study regarding these two variables. It is in this context that the researcher prompted to conduct this study and address geographical research gap of these subjects.

II. BODY OF ARTICLE

Statement of the Problem

This study is aimed to find out the relationship between facilitation of student academic engagement and computational thinking skill of students. Specifically, this study sought to answer the following objectives:

1. What is the level of facilitation of student academic engagement in terms of:
 - 1.1 Mastery Self-talk;
 - 1.2 Relevance Enhancement;
 - 1.3 Situational Interest Enhancement;
 - 1.4 Self-Consequating, and
 - 1.5 Environmental Structuring?
2. What is the level of computational thinking skill of students in terms of:
 - 2.1 Creativity;
 - 2.2 Algorithmic Thinking;
 - 2.3 Cooperativity;
 - 2.4 Critical Thinking, and
 - 2.5 Problem-Solving?
3. Is there a significant relationship between relationship between facilitation of student academic engagement and computational thinking skill of students?

Hypothesis

Ho1. There is no significant relationship between relationship between facilitation of student academic engagement and computational thinking skill of students.

III. METHODOLOGY

Research Design

This study will adopt a quantitative correlational research design to examine the relationship between facilitation of student academic engagement and computational thinking skill of students. The quantitative approach allows for statistical analysis of the strength and direction of associations between variables, providing empirical evidence on how teacher competencies in digital technology influence students’ motivation and learning behavior.

Non-experimental correlational research is a research design used to determine whether and to what degree a relationship exists between two or more quantifiable variables, without establishing cause and effect in which in this study, it will look into the relationship between facilitation of student academic engagement and computational thinking skill of students.

Statistical Treatment

The following statistical tools were used in the analysis of data.

Mean. This will be used to determine the level of facilitation of student academic engagement and computational thinking skill of students.

Pearson r. This will be used to determine the significance of the relationship between of facilitation of student academic engagement and computational thinking skill of students.

IV. RESULTS AND DISCUSSION

Level of Facilitation of Student Academic Engagement

Shown in Table 1 is the level of facilitation of student academic engagement with an overall mean of 3.78 with a descriptive equivalent of high indicating that all enumerated indicators were oftentimes observed. The overall mean was the result obtained from the mean of the indicators for the specific items from the questionnaire intended for this particular indicator which was appended in this study.

Among the enumerated indicators, environmental structuring has the highest mean rating with a mean score of 3.90 or high, relevance enhancement, 3.84 or high, self-consequating, 3.82 or high, situation interest, 3.78 or high, mastery self-talk, 3.56 or high.

Table 1. Facilitation of Student Academic Engagement

Indicators	Mean	Descriptive Levels
Mastery Self-talk	3.56	High
Relevance Enhancement	3.84	High
Situational Interest Enhancement	3.78	High
Self-Consequating	3.82	High
Environmental Structuring	3.90	High
Overall	3.78	High

The result of the study resonates with the statement of Shin & Bolkan (2021) who establishes that The facilitation of student academic engagement involves creating conditions and using strategies that actively involve students in the learning process. Teachers play a central role by designing lessons that are interactive, meaningful, and relevant to students’ lives. When instruction includes discussions, hands-on activities, problem-solving tasks, and real-world applications, students are more likely to participate actively and remain focused. Clear learning objectives, structured activities, and varied teaching methods also help sustain attention and interest.

The result of the study corresponds with the statement of Meng, & Zhang (2023) effective facilitation of academic engagement includes monitoring and responding to students’ needs. Teachers should regularly assess participation and understanding, adjusting instruction to maintain appropriate levels of challenge. Incorporating technology, collaborative learning, and differentiated instruction can address diverse learning styles and keep students actively involved. Overall,

fostering academic engagement requires a balanced approach that combines meaningful instruction, supportive relationships, and responsive teaching practices to promote sustained interest and achievement.

Level of Computational Thinking Skill of Students

Shown in Table 2 is the level of computational thinking skill of students with an overall mean of 4.11 with a descriptive equivalent of very high indicating that all enumerated indicators were oftentimes observed. The overall mean was the result obtained from the mean of the indicators for the specific items from the questionnaire intended for this particular indicator which was appended in this study.

Table 2. Computational Thinking Skill of Students

Indicators	Mean	Descriptive Levels
Creativity	3.98	High
Algorithmic Thinking	3.84	High
Cooperativity	3.88	High
Critical Thinking	3.70	High
Problem-Solving	3.67	High
Overall	3.81	High

Among the enumerated indicators, creativity the highest mean rating with a mean score of 3.98 or high, algorithmic thinking, 3.84 or high, cooperativity, 3.88 or high, critical thinking, 3.70 or high, and problem-solving, 3.67 or high.

The result of the study supports the statement of Polat, Hopcan, Kucuk & Sisman (2021) who affirm that Computational thinking is a problem-solving skill set that enables students to approach complex tasks in a structured, logical, and efficient way. It involves breaking down problems into smaller, manageable parts (decomposition), identifying patterns, abstracting key information, and developing step-by-step solutions (algorithms). These skills are not limited to computer science; they are transferable across subjects such as mathematics, science, and even humanities. By developing computational thinking, students learn how to analyze problems critically and design solutions that can be replicated or automated.

The result of the study is in agreement with the statement of Cheng, Lai, Chen, Wang, Huang & Wu (2023) who asserts that in the classroom, fostering computational thinking helps students become more independent and strategic learners. For example, when faced with a challenging math problem, a student using computational thinking might first identify known and unknown elements, recognize similarities to previous problems, and plan a sequence of steps to solve it. Similarly, in science, students can use these skills to design experiments, analyze data, and draw conclusions. Integrating activities like coding, logic puzzles, and data organization tasks can strengthen these abilities while also making learning more interactive and engaging.

Significance on the Relationship between Facilitation of Student Academic Engagement and Computational Thinking Skill of Students

Illustrated in Table 3 were the results of the test of relationship between variables involved in the study. The overall correlation had a computed value of 0.385 with a probability value of $p < 0.01$ which is significant at 0.05 level. Hence the null hypothesis which states that there is no significant relationship between facilitation of student academic engagement and computational thinking skill of students is rejected.

The result of the study confirms the statement of Liu, Peng & Srivastava (2023) who asserts that The relationship between the facilitation of student academic engagement and students' computational thinking skills is deeply interconnected, as engagement provides the foundation for active learning while computational thinking represents a structured approach to problem-solving and higher-order cognition. When educators intentionally structure the learning environment, design interactive activities, and create opportunities for collaboration, students are more likely to participate actively and sustain attention. This engagement creates the conditions for students to practice decomposition, pattern recognition, algorithmic thinking, and other computational thinking skills in meaningful contexts, rather than in abstract or isolated exercises. Essentially, engagement acts as the catalyst that motivates students to apply and refine their computational thinking abilities.

Table 3. Significance on the Relationship between Facilitation of Student Academic Engagement and Computational Thinking Skill of Students

Pair	Variables	Correlation Coefficient	p-value	Decision on Ho
IV and DV	Facilitation of Student Academic Engagement and Computational Thinking Skill of Students	0.385	0.000	Reject

The result of the study is in line with the statement of Zhou & Tsai (2023) who acknowledge that environmental structuring, clear routines, and collaborative activities, key strategies for promoting academic engagement, also directly support the development of computational thinking. For instance, when students are engaged in group problem-solving tasks or coding projects, they naturally apply algorithmic thinking, critical thinking, and creative problem-solving. Similarly, when learning materials are organized effectively and learning goals are clearly communicated, students can focus more on analyzing problems, designing solutions, and iterating strategies. Engagement fosters persistence and curiosity, which are essential for students to experiment with solutions, reflect on outcomes, and develop flexible computational thinking approaches.

V. CONCLUSION

Based from the findings of the study, conclusions are drawn in this section. The study found to exhibit a high level of facilitation of student academic engagement. This means that the provisions relating to facilitation of student academic engagement is oftentimes observed. The study revealed a high level of computational thinking skill of students. This indicates that the provisions relating to computational thinking skill of students are embodied in the item is oftentimes observed.

The results of the study also confirm that there is a significant relationship between facilitation of student academic engagement and computational thinking skill of students. This implies that the higher the facilitation of student academic engagement, the higher is the computational thinking skill of students. Thus, the null hypothesis of no significant relationship between facilitation of student academic engagement and computational thinking skill of student was rejected.

VI. RECOMMENDATIONS

The study found to exhibit a high level of facilitation of student academic engagement. The researcher recommends that students may improve in the area of mastery self-talk as this has the lowest among all the indicators. The students may focus on setting clear learning goals, breaking tasks into manageable objectives; Use positive self-talk and self-motivation techniques to stay persistent, and challenge oneself with tasks slightly beyond current skills; Maintain curiosity and reflection by asking what can be learned and reviewing progress, and ensure consistent effort through regular, focused study sessions, valuing learning for its own sake rather than just completing tasks.

The study revealed a high level of computational thinking skill of students. The researcher recommends that students may improve in the area of problem-solving being the lowest among all the indicators. The students may break problems into small steps and visualize each step. Focus on applying solutions gradually, one step at a time. Practice generating multiple ideas without judging them, and start by sharing small contributions in group work. Manage your energy in cooperative learning by taking breaks and dividing tasks. These strategies help improve problem-solving, idea generation, and participation in group learning.

The results of the study also confirm that there is a significant relationship between facilitation of student academic engagement and computational thinking skill of students. The researcher recommends that students may actively participate in classroom activities, group projects, and problem-solving tasks to strengthen both engagement and computational thinking; take initiative in applying structured thinking, algorithmic reasoning, and critical analysis to learning tasks; reflect on your learning process, experimenting with multiple approaches to solve problems and improve understanding, and practice collaborative problem-solving, sharing ideas, and learning from peers to enhance cooperative computational thinking.

Teachers may design learning environments and activities that are interactive, challenging, and supportive, encouraging active engagement; integrate tasks that require algorithmic thinking, problem decomposition, and creative solution generation into lessons; provide opportunities for students to work collaboratively on projects, promoting both engagement

and cooperative computational thinking, and give timely feedback, scaffolding, and guidance to help students connect their engagement with practical computational problem-solving skills.

Principals may support professional development programs that train teachers in strategies to enhance student engagement and computational thinking; encourage the adoption of classroom structures, resources, and technology that promote active learning and collaborative problem-solving; foster a school culture that values curiosity, experimentation, and persistence, linking engagement with critical thinking and computational skills, and monitor and recognize teachers who successfully integrate engagement-fostering strategies with computational thinking activities.

District supervisors may develop policies and initiatives that prioritize both student engagement and computational thinking in curriculum design; provide funding, resources, and training for schools to implement technology-rich, interactive, and collaborative learning environments; evaluate and support programs that demonstrate improvements in student engagement and computational problem-solving skills, and encourage data-driven decision-making to identify best practices and scale effective strategies across schools in the district.

The researcher also recommends to future researchers to conduct similar study and explore some indicators that are not included in this study in another setting in order to uncover new knowledge relevant to the topics presented in this study.

REFERENCES

- [1] Cheng, Y. P., Lai, C. F., Chen, Y. T., Wang, W. S., Huang, Y. M., & Wu, T. T. (2023). Enhancing student's computational thinking skills with student-generated questions strategy in a game-based learning platform. *Computers & Education*, 200, 104794.
- [2] Liu, S., Peng, C., & Srivastava, G. (2023). What influences computational thinking? A theoretical and empirical study based on the influence of learning engagement on computational thinking in higher education. *Computer Applications in Engineering Education*, 31(6), 1690-1704.
- [3] Meng, Q., & Zhang, Q. (2023). The influence of academic self-efficacy on university students' academic performance: The mediating effect of academic engagement. *Sustainability*, 15(7), 5767.
- [4] Polat, E., Hopcan, S., Kucuk, S., & Sisman, B. (2021). A comprehensive assessment of secondary school students' computational thinking skills. *British Journal of Educational Technology*, 52(5), 1965-1980.
- [5] Shin, M., & Bolkan, S. (2021). Intellectually stimulating students' intrinsic motivation: the mediating influence of student engagement, self-efficacy, and student academic support. *Communication Education*, 70(2), 146-164.
- [6] Smith, W. C., Voigt, A., & Zhang, Y. (2021). Barriers to secondary education in the Asia Pacific Region: A scoping review of four countries. *Institute for Education, Community & Society, Moray House School of Education and Sport*.
- [7] Tekdal, M. (2021). Trends and development in research on computational thinking. *Education and Information Technologies*, 26(5), 6499-6529.
- [8] Zhou, X., & Tsai, C. W. (2023). The effects of socially shared regulation of learning on the computational thinking, motivation, and engagement in collaborative learning by teaching. *Education and Information Technologies*, 28(7), 8135-8152.