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The Moderating Influence of School Type on Teaching Strategies and Critical Thinking Skills in Senior High School Students

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ABSTRACT

This study examined the moderating influence of school type on teaching strategies and critical thinking skills among senior high school students. Employing a descriptive-correlational research approach, the study utilized advanced statistical analyses, such as Pearson's r and regression analyses, to examine the correlation of the teaching strategies and critical thinking skills, and to ascertain any moderating effects. Data were collected from 300 grade 12 STEM students using validated questionnaires measuring teaching strategies and critical thinking skills among students. The results revealed that teaching strategies are highly utilized, with affective and behavioral strategies being the most implemented, while cognitive strategies, although slightly less employed, still showed substantial usage. Students demonstrated high levels of critical thinking, particularly excelling in Thinking Outside the Box, underscoring the importance of fostering creativity to enhance critical thinking skills. The application of instructional strategies and improvement of critical thinking abilities among senior high school students were also found to be positively correlated, with the type of school showing a significant positive moderated effect. Notably, students' critical thinking abilities can be significantly improved by using diverse teaching strategies that encourage students to create, innovate, and solve problems, which enable them to thrive in various educational environments.

INTRODUCTION

Critical thinking is a fundamental skill for navigating complex information landscapes. It empowers an individual to analyze ideas, make reasoned decisions, and reach informed conclusions. Students need critical thinking skills in understanding content materials, in analyzing and solving problems, and navigating the modern world, leading to their success in both school and in life. However, results from both local and international assessments show that a substantial proportion of students from various contexts still struggle with higher-order levels of assessment.

Recent international assessment results, such as Programme for International Student Assessment (PISA), show that Filipino students have difficulty in dealing with tasks requiring them to critically analyze information and solve complex problems. In fact, results from the said assessment showed the underperformance of the Philippines in comparison to the other OECD countries, with the Philippines ranking 77th out of 79 in the assessment related to Mathematics (OECD, 2019; DepEd, 2019). Such international assessments test students' ability to apply and solve real-world problems, revealing gaps in these abilities among Filipino students. Similarly, fourth-grade Filipino students took the 2019 Trends in International Mathematics and Science Study (TIMSS) assessment, where students averaged 297 in Mathematics, putting the Philippines in the last rank among the 58 countries that participated in the assessment. These findings highlight the persistent

problem in the development of the students' critical thinking necessary to compete globally. Such a gap between the current abilities of Filipino students and the international standards demands attention from educators and policymakers.

Teaching strategies play an important role in any classroom instruction (Vale & Barbosa, 2023; Dicuquin *et al.*, 2023). Behavioral strategies, such as structured questioning, scaffolding, and guided practice, promote active engagement and observable participation in tasks that demand analysis and evaluation (Magpantay & Pasia, 2022). Teacher-initiated questioning and collaborative problem-solving create opportunities for learners to demonstrate systematic reasoning and logical consistency in approaching mathematical and real-world problems (Ridwan *et al.*, 2022). Cognitive strategies directly cultivate the mental processes required for higher-order thinking, with approaches like problem-based learning, inquiry-based learning, and metacognitive reflection shown to enhance analysis, synthesis, and evaluation (Putri *et al.*, 2023; Elketani, 2023). The core purpose of such strategies is not only to enhance memory but also to improve information processing among students, allowing them to solve problems, ask questions, and apply information in new situations. Affective strategies are strategies that assist in the development of the affective aspects of learning, such as emotions, values, and even dispositions towards mathematics. Strategies that help nurture their curiosity, such as the Socratic method and reflection activities that encourage them to reflect on their learning

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process, are crucial in the cultivation of critical thinking (Berg, 2024). All of these strategies highlight the role of critical thinking in holistically shaping how students act, think, and feel within the learning environment.

This study is anchored in Piaget's Cognitive Development Theory (Piaget, 1976), which posited that an individual actively constructs knowledge and processes information through stages. Each stage highlights how an individual processes information through assimilation and accommodation until it reaches more advanced cognitive thinking. In this theory, students are considered active participants in the construction of their knowledge through engagement with their environment. A plethora of research supports the effectiveness of problem and inquiry-based activities in the construction of knowledge among students, more so if integrated in an interactive learning environment (MacQueeney *et al.*, 2022; Jamarillo Gomez *et al.*, 2025). Anchoring the variables under study to the theory implies the creation of learning environments that scaffold the development of all the cognitive skills among students, more specifically, their critical thinking skills.

While research has identified a list of successful teaching strategies, the extent to which they influence the development of students' critical thinking skills may still vary depending on different educational environments. Factors like resources, teacher autonomy, and institutional support may strengthen or weaken the effectiveness of these approaches (Talebi & IranNejad, 2020; Sherafat & Murthy, 2016). Given the variability in educational resources and contexts across different school types, the researchers recognize the importance of investigating whether and how teaching strategies translate into critical thinking skills under diverse learning conditions. Exploring the moderating influence of school type can shed light on how contextual factors shape student outcomes and inform targeted pedagogical improvements. This study addresses a notable gap in the literature and has direct implications for policy, curriculum design, and teacher professional development, particularly in the local setting where issues of access, equity, and resource allocation significantly differ.

Ultimately, this study investigated the relationship between teaching strategies and students' critical thinking skills, with particular attention to the moderating role of school type. It further examined the extent to which teaching strategies and critical thinking skills are utilized and evaluated the stated hypotheses at a 0.05 level of significance.

MATERIALS AND METHODS

Research Respondents

This study involved 300 grade 12 STEM senior high school students from both local public and private high schools within the city. The respondents were identified using a quota sampling, which involves selecting a sample from a population divided into subgroups (Iliyasu & Etikan, 2021). Unlike stratified sampling, which relies on

the random selection of each subgroup, quota sampling uses a convenience method within each subgroup. This sampling technique was deemed appropriate given the diversity of the population, as it allowed the researchers to capture variation across key characteristics while maintaining representativeness in the sample.

Research Instruments

Two adapted instruments were employed in this study. The first adapted survey questionnaire developed by AbdelWahab and Hamzeh (2014) was used to measure the variable teaching strategies. The instrument consists of 51 items distributed on three subscales, namely Behavioral Strategies with 15 items, Cognitive Strategies with 21 items, and Affective Strategies with 15 items. The instrument demonstrated excellent internal consistency, with a Cronbach's Alpha coefficient of 0.966. The second adapted survey questionnaire developed by Hwang *et al.* (2010) was used to measure critical thinking skills. The instrument consists of 18 items with three subscales, namely Systematic Analysis (5 items), Thinking Within the Box (8 items), and Thinking Outside the Box (5 items). The two adapted questionnaires were validated and demonstrated excellent and acceptable internal consistencies, with Cronbach's Alpha coefficients of 0.966 and 0.738, respectively.

Both questionnaires followed a five-point Likert Scale. This scale comprises five distinct levels, each corresponding to a different level of utilization of teaching strategies and critical thinking skills. A mean score of 4.21 - 5.00 is described as very high, signifying that the statement is constantly being performed. A mean score of 3.41 - 4.20 is described as high, suggesting that the statement was performed 7 to 9 times out of 10 situations. A mean score of 2.61 - 3.40 is described as moderate, indicating that the statement is neither practiced in all situations. A mean score of 1.81 - 2.60 is described as low, signifying that the statement was not performed 7 to 9 times out of 10 situations. Lastly, a mean score of 1.00 - 1.80 is described as very low, which represents that the statement is not performed at all times. These rating levels served as valuable tools for interpreting and categorizing the diverse degrees of utilization of teaching strategies and critical thinking skills displayed by the respondents, spanning the spectrum from very low to very high.

Design and Procedure

This study employed a descriptive-correlational research approach to examine the correlation of the teaching strategies and critical thinking skills, and to ascertain any moderating effects. By utilizing this approach, the study does not merely describe existing relationships but also explores whether variations in school type influence the strength or direction of the association between the variables.

Prior to data collection, permission was sought from school administrators, and informed consent was obtained from the participants. The adapted instruments

measuring teaching strategies and critical thinking skills were administered to senior high school students from both public and private schools. To ensure reliability and validity of the instruments, expert validation was conducted, and Cronbach's alpha coefficients were computed, yielding satisfactory values. The questionnaires were distributed and collected on-site, and participants were assured of confidentiality and voluntary participation.

The gathered data were encoded, organized, and analyzed using appropriate statistical tools. Descriptive statistics, specifically weighted mean and standard deviation, were employed to determine the extent of teaching strategies utilized and the level of students' critical thinking skills. Pearson's correlation coefficient was used to examine the relationship between teaching strategies and critical

thinking skills. To test the moderating influence of school type, regression-based moderation analysis was conducted. All hypotheses were tested at a 0.05 level of significance.

RESULTS AND DISCUSSION

Utilization of Teaching Strategies

It is revealed in Table 1 that the overall mean of the levels of utilization of teaching strategies of the respondents is 4.26 (SD = .41), which can be interpreted as very high, and the responses were relatively close to the mean. The very high level of utilization of teaching strategies implies that educators are highly engaged in using diverse and potentially innovative teaching methods, which may contribute to improved learning outcomes for students.

Table 1: Utilization of Teaching Strategies

Indicators	Mean	Standard Deviation
Behavioral Strategies	4.27	.42
Cognitive Strategies	4.24	.44
Affective Strategies	4.27	.46
Overall	4.26	.41

This equilibrium aligns with recent findings of Papatungan E., & Papatungan, F. (2024), who highlighted how diverse strategy deployment enhances student engagement, both directly and through emotional connection, while Joshi *et al.* (2022) show similarly high engagement across cognitive and emotional dimensions in mathematics learning contexts. Various research further supports that effective teaching strategies that consider students' affective characteristics lead to improved learning outcomes, echoing the high mean scores for behavioral and affective strategies in this study (Vankus, 2021; Hui & Mahmud, 2023). Chiu *et al.* (2021) demonstrated that understanding the interplay of affect and cognition in mathematics learning is crucial for student success,

supporting the effectiveness of these strategies. These studies collectively highlight the balanced approach that integrates behavioral, affective, and cognitive strategies to optimize student learning.

Critical Thinking Skills

Table 2 shows the levels of students' critical thinking skills with an overall mean of 4.21 (SD = 0.43). This can be interpreted as the students having a very high level of critical thinking skills with minimal deviation in their responses. This can be further interpreted as students are capable of engaging in complex tasks that require their analysis, creativity, reasoning, and, more so, their decision-making skills.

Table 2: Critical Thinking Skills

Indicators	Mean	Standard Deviation
Systematic Analysis	4.09	.58
Thinking within the box	4.25	.47
Thinking outside the box	4.28	.49
Overall	4.21	.43

It can be seen in the table above that Thinking Outside the Box obtained the highest mean (SD = .49). This suggests that students have a high regard for their skills in solving problems in a creative and unconventional way. This was closely followed by Thinking Within the Box (SD = .47), indicating that students also have a high regard for utilizing their logic and reasoning in dealing with various information. Systematic Analysis received the lowest mean but was still interpreted within a high range. This implies that, though students engage in analytic and structured processes, they are more inclined

to explore and create ideas and information, reflecting a diversified critical thinking profile among students.

The findings of this study align with existing research that emphasizes the importance of all these critical thinking dimensions in the cognitive development of an individual. The indicator Thinking Outside the Box, being the highest mean score, is supported by Yang and Zhao (2021), who underscored the role of creative thinking in enhancing the cognitive abilities of students, more specifically in the problem-solving aspect. On the other hand, the high scores for Systematic Analysis

highlight a gap identified by Wani & Hussian (2024), who argue that while innovative thinking is crucial, systematic analysis remains foundational for critical thinking. The implications of these findings suggest that while current teaching strategies effectively promote creative thinking, there is a need for more targeted interventions to maintain and also improve students' systematic analytical skills.

Utilization of Teaching Strategies and Critical Thinking Skills

The results of the correlation test of utilization of teaching strategies and students' critical thinking skills are presented in Table 3. The overall r -value is 0.575 ($p < 0.05$), indicating a moderately positive correlation between teaching strategies and students' critical thinking skills. This implies that when the levels of teaching strategies utilization increase, their critical thinking skills also increase. The results also show the rejection of the null hypothesis since the p -value is less than the significance level, 0.05.

Table 3: Correlation Matrix of Utilization of Teaching Strategies and Students' Critical Thinking Skills

Utilization of Teaching Strategies	Critical Thinking Skills			
	System Analysis	Thinking within the box	Thinking outside the box	Overall
Behavioral Strategies	.517*	.555*	.553*	.636*
Cognitive strategies	.399*	.573*	.434*	.543*
Effective strategies	.331*	.440*	.332*	.417*
Overall	.447*	.574*	.471*	.575*

* $p < 0.05$ *, significant

The positive correlation between teaching strategies and critical thinking skills is consistent with the findings by Arviani, Wahyudin, and Dewi (2023), who concluded that students' critical thinking abilities can be improved by designing teaching strategies that encourage them to think critically. Recent research highlights that various teaching strategies demonstrate an association with student' abilities to analyze, evaluate, and generate creative solutions to problems (Anggraeni *et al.*, 2023; Okolie *et al.*, 2022). When teachers use methods that encourage students to construct knowledge and reflect on their learning process, they become more efficient in analyzing and evaluating information (Nurideen, *et al.*, 2024; Notobushi, 2023; Simanjuntak *et al.*, 2021). Similarly, when students are given tasks that tackle complex and real-world problems instead of memorizing facts, they develop their reasoning skills and become better problem-solvers (Yu *et al.*, 2024). Such findings on the association among the constructs are instrumental in identifying effective teaching strategies that can enhance higher-order thinking among students, necessary for them to thrive in this ever-changing world.

Moderation Analysis of School Type on Teaching Strategies and Critical Thinking Skills

The study explored the moderating influence of school type on the relationship between teaching strategies and critical thinking skills among senior high school students. Table 4 presents the regression analysis indicating a significant moderation effect of school type on the association of teaching strategies and critical thinking skills. The results show that the utilization of teaching strategies in private schools explains 36.7% ($R^2 = .367$) of the variance in students' perceptions of these strategies. The regression analysis further reveals that 89.3% ($R^2 = .893$) of the variance in critical thinking skills among private school students can be attributed to the utilization of teaching strategies, which highlights the significant impact of teaching strategies on critical thinking skills within such specific educational environments. The stronger link found in private schools suggests that factors such as available resources, teacher preparation, and curriculum flexibility may contribute to the greater effectiveness of these strategies (Sha *et al.*, 2022).

Table 4: Regression Analysis of School Type on Teaching Strategies and Critical Thinking Skills

School Type (Private)	B	SE	β
Utilization of Teaching Strategies	1.384	.219	
School Type: Private	.514*	.252*	.136*
$R^2 = .367$	.134*	.038	.305*
F = .000			
Constant		4.267	.117
Utilization of Teaching Strategies		-.017	.026
School Type: Private		-2.659	.074
Critical Thinking Skills			
$R^2 = .893$			
F = .000			

* $p < 0.05$ *, significant

The findings of this study align with existing literature that emphasizes the critical role of teaching strategies in fostering critical thinking skills, particularly in private school settings. Recent research studies (Loaiza *et al.*, 2025; Bacan, 2025; Galope & Gumanoy, 2025) reinforce the idea that private schools often implement more structured and diverse teaching strategies than their public-school counterparts. Such integration of more student-centered strategies is likely facilitated by greater instructional autonomy, enabling the use of methods such as project-based, cooperative learning, and even AI-driven technology that are empirically known to boost student engagement and cognitive development (Rabiu *et al.*, 2025; Lin, 2025). These studies collectively reinforce the importance of employing teaching strategies that enhance critical thinking skills and highlight the need for continuous improvement of strategies across diverse educational settings.

CONCLUSIONS

This study assessed the moderating influence of school type on teaching strategies and critical thinking skills among senior high school students. The results revealed that teaching strategies are highly utilized across different school types, with Affective Strategies and Behavioral Strategies showing a very high level of usage, and Cognitive Strategies showing a high level but still substantial usage. These findings suggest that students consistently experience various instructional approaches, and teachers are intentionally making efforts to make students apply what they have learned. The students exhibited very high levels of critical thinking skills, with Thinking Outside the Box obtaining the highest mean. This shows that students who are encouraged to think creatively and innovatively tend to develop advanced critical thinking abilities. Systematic analysis, though getting the lowest mean among the three dimensions, obtained a high mean score, indicating that students are still capable of breaking down complex information, following logical processes, and arriving at well-thought-out decisions.

Moreover, the study shows a moderately positive correlation between the utilization of teaching strategies and the enhancement of critical thinking skills. It further indicates that better teaching strategies lead to stronger development of students' critical thinking skills. Notably, private schools were found to be more successful in developing students' critical thinking skills, which suggests that such a school type may have greater resources or flexibility to implement innovative teaching methods, thereby significantly supporting the development of students' critical thinking abilities.

Based on these findings, it is recommended that teachers, regardless of the school type, should continue the utilization of diverse strategies. Further, policymakers are recommended to investigate specific resources and policies that private schools implement, and consider how these can be adapted and scaled for public education systems.

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REFERENCES

- Anggraeni, D. M., Prahani, B. K., Suprpto, N., Shofiyah, N., & Jatmiko, B. (2023). Systematic review of problem based learning research in fostering critical thinking skills. *Thinking Skills and Creativity*, 49, 101334.
- Arviani, F. P., Wahyudin, D., & Dewi, L. (2023). Role of teaching strategies in promoting students' higher order thinking skills and critical thinking dispositions. *International Journal of Learning, Teaching and Educational Research*, 22(9).
- Bacan, C. J. D. (2025). Adapting in the New Normal: Experiences and Viewpoints of Private School Mathematics Teachers to Blended Distance Learning Delivery. *International Journal of Research and Innovation in Social Science*, 9(4), 5308-5323.
- Berg, L. (2024). *Motivating Math Students through Socratic Pedagogy*.
- Chiu, M. S., Lin, F. L., Yang, K. L., Hasumi, T., Wu, T. J., & Lin, P. S. (2022). The interplay of affect and cognition in the mathematics grounding activity: Forming an affective teaching model. *Eurasia Journal of Mathematics, Science and Technology Education*, 18(12), em2187.
- Department of Education. (2019). *PISA 2018 national report of the Philippines*. Pasig City: Bureau of Education Assessment, Department of Education. <https://www.deped.gov.ph/wp-content/uploads/2019/12/PISA-2018-Philippine-National-Report.pdf>
- Didiquin, J. B., Mobo, F. D., & Cutillas, A. L. (2023). Evaluating the effectiveness of professional development programs for junior high school mathematics teachers in improving mathematics instruction in the K to 12 curriculums in the Philippines. *International Journal of Multidisciplinary: Applied Business and Education Research*, 4(4), 1143-153.
- Galope, G. P., & Gumanoy, R. M. (2025). Mathematics Mastery through Innovative Pedagogical Approaches. *International Journal of Research and Innovation in Applied Science*, 10(2), 442-452.
- Hamzeh, M. A. H. (2014). Teaching strategies used by Mathematics teachers in the Jordan Public Schools and their relationship with some variables. *American Journal of Educational Research*, 2(6), 331-340.
- Hui, H. B., & Mahmud, M. S. (2023). Influence of game-based learning in mathematics education on the students' cognitive and affective domain: A systematic review. *Frontiers in psychology*, 14, 1105806.

- Hwang, S. Y., Yen, M., Lee, B. O., Huang, M. C., & Tseng, H. F. (2010). A critical thinking disposition scale for nurses: short form. *Journal of clinical nursing*, 19(21-22), 3171-3176.
- Ilyasu, R., & Etikan, I. (2021). Comparison of quota sampling and stratified random sampling. *Biom. Biostat. Int. J. Rev.*, 10(1), 24-27.
- Jaramillo Gómez, D. L., Álvarez Maestre, A. J., Parada Trujillo, A. E., Pérez Fuentes, C. A., Bedoya Ortiz, D. H., & Sanabria Alarcón, R. K. (2025). Determining Factors for the Development of Critical Thinking in Higher Education. *Journal of Intelligence*, 13(6), 59.
- Joshi, D. R., Adhikari, K. P., Khanal, B., Khadka, J., & Belbase, S. (2022). Behavioral, cognitive, emotional and social engagement in mathematics learning during COVID-19 pandemic. *PloS one*, 17(11), e0278052.
- Lin, A. (2025). Comparative analysis of public and private secondary school education systems in the United States. *Journal of Education and Educational Policy Studies*, 3(2), 84-87.
- Loaiza, Y. E., Zona, J. R., & Rios, M. F. (2025). Critical Thinking and Teacher Training in Secondary Education. *Journal of Intelligence*, 13(3), 37.
- MacQueeney, P., Lewis, E., Fulton, G., Surber, C., Newland, K., Hochstetler, E., & Tilak, S. (2022). Applying Piaget to classroom teaching: Stage development and social learning theory. Theories, strategies and semiotic tools for the classroom.
- Magpantay, I. C., & Pasia, A. (2022). Problem-based learning materials in upskilling mathematics critical thinking skills. *International Journal of Science, Technology, Engineering and Mathematics*, 2(4), 74-91.
- Mullis, I. V. S., Martin, M. O., Foy, P., Kelly, D. L., & Fishbein, B. (2020). TIMSS 2019 International Results in Mathematics and Science. *TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College, and International Association for the Evaluation of Educational Achievement*. <https://timssandpirls.bc.edu/timss2019/international-results/>
- Nobutoshi, M. (2023). Metacognition and reflective teaching: a Synergistic Approach to fostering critical thinking skills. *Research and Advances in Education*, 2(9), 1-14.
- Nurideen, S., Amenyi, C. K., Saaha, C., & Yunus, H. (2024). Learner-centred teaching strategies that can be incorporated with guided discovery method on senior high school students' achievement in circle theorems. *American Journal of Interdisciplinary Research and Innovation*, 3(1), 10-25.
- Okolie, U. C., Igwe, P. A., Mong, I. K., Nwosu, H. E., Kanu, C., & Ojemuyide, C. C. (2022). Enhancing students' critical thinking skills through engagement with innovative pedagogical practices in Global South. *Higher Education Research & Development*, 41(4), 1184-1198.
- Organisation for Economic Co-operation and Development. (2019). *PISA 2018 results (Volume I): What students know and can do*. OECD Publishing. <https://doi.org/10.1787/5f07c754-en>
- Paputungan, E., & Paputungan, F. (2023). The Role and Function of Affective approaches in learning. *Journal of Education and Culture (JEdC)*, 3(1), 57-65. <https://doi.org/10.47918/jeac.v3i1.1136>
- Piaget, J. (1976). Piaget's theory. In *Piaget and his school: A reader in developmental psychology* (pp. 11-23). Berlin, Heidelberg: Springer Berlin Heidelberg.
- PISA 2018 National Report of The Philippines (p. 43). (2019). Department of Education.
- Putri, D. K., Hidayah, R., & Yuwono, Y. D. (2023). Problem based learning: Improve critical thinking skills for long life learning. *Jurnal Penelitian Pendidikan IPA*, 9(7), 5049-5054.
- Rabiu, F. A., Bako, N. Z., & Ogundipe, M. O. (2025). AI-Driven Virtual Reality for Enhancing Stem Identity and Social-Emotional Skills in K-12. *American Journal of Multidisciplinary Research and Innovation*, 4(4), 155-166. <https://doi.org/10.54536/ajmri.v4i4.4729>
- Ridwan, M. R., Retnawati, H., Hadi, S., & Jailani. (2022). Teachers' perceptions in applying mathematics critical thinking skills for middle school students: A case of phenomenology. *Anatolian Journal of Education*, 7(1), 1-16.
- Shah, N. H., Shaheen, A. K., & Kiani, K. M. (2022). Teaching strategies used by public and private school teachers: A comparative study of secondary schools of Azad Jammu and Kashmir. *Pakistan Languages and Humanities Review*, 6(4), 102-114.
- Sherafat, R., & Murthy, C. V. (2016). A comparative study of government and private school students on their critical thinking and study habits. *The International Journal of Indian Psychology*, 3(4), 52-60.
- Simanjuntak, M. P., Hutahaean, J., Marpaung, N., & Ramadhani, D. (2021). Effectiveness of Problem-Based Learning Combined with Computer Simulation on Students' Problem-Solving and Creative Thinking Skills. *International Journal of Instruction*, 14(3), 519-534.
- Talebi, S., & IranNejad, P. (2020). Comparing the descriptive assessment in terms of critical and creative thinking among the sixth grade students in the public and private schools. *Journal of Social Sciences and Humanities Research*, 8(1), 29-37.
- Vale, I., & Barbosa, A. (2023). Active learning strategies for an effective mathematics teaching and learning. *European Journal of Science and Mathematics Education*, 11(3), 573-588.
- Vankúš, P. (2021). Influence of game-based learning in mathematics education on students' affective domain: A systematic review. *Mathematics*, 9(9), 986.
- Wani, S. A., & Hussian, Z. (2024). Developing critical thinking skills: Encouraging analytical and creative thinking. In *Transforming education for personalized learning* (pp. 114-130). IGI Global Scientific Publishing.
- Yang, J., & Zhao, X. (2021). The effect of creative thinking on academic performance: Mechanisms, heterogeneity, and implication. *Thinking Skills and Creativity*, 40, 100831.
- Yu, S., Jantharajit, N., & Srikhao, S. (2024). An Instructional Approach in Mathematics Learning for Fourth-Grade Students Based on Collaborative Learning and Inquiry-Based Learning. *Asian Journal of Contemporary Education*, 8(2), 77-92.