
The Impact of Creative Thinking on Senior High School Students at Dagupan City National High School

Wu Weilin

Christopher L. Infante

Lyceum Northwestern University

Abstract — Creative thinking is increasingly recognized as a vital skill for students to cultivate, enabling them to effectively address complex challenges and contribute innovatively to various fields. This study investigated the impact of creative thinking on senior high school students at Dagupan City National High School (DCNHS). A descriptive-quantitative design was employed in this study. The data were collected through a self-developed questionnaire distributed in printed format. The collected data underwent analysis and interpretation using percentage, frequency counts, weighted mean, Pearson-R, Point-Biserial, Spearman rho, and Analysis of Variance (ANOVA). The analysis revealed that there is no significant relationship between the profile and the level of creative thinking in Senior High School students of DCNHS. Additionally, there is no significant difference in the level of creative thinking among the respondents under the different academic strands. It is suggested that while there are areas of strength in students' creative thinking, there's also room for improvement. By tailoring teaching approaches, focusing on skill development, and maintaining a commitment to fostering creativity, the school can create an environment where students not only excel academically but also thrive as innovative thinkers prepared for the challenges of the future.

Keywords: impact, creative thinking, Senior High School, academic strand

I. INTRODUCTION

The sciences, technology, economics, and education have all been proven to be significantly impacted by creative thinking over the last few decades (OECD, 2023). The 21st century has brought about a constant state of reform in education, never more so than in the previous sixteen years (Kauper & Jacobs, 2019). Employment is no longer always location-based in the twenty-first century, and the workforce now needs to possess new, varied competencies. The importance of thinking skills, particularly creative thinking, has been reemphasized as a means of preparing students for life in the twenty-first century (Davies, Newton, & Newton, 2019). The search for new knowledge and innovation is sparked by creative thinking, which ensures its presence in the classroom.

It is noted that creative thinking is one of the higher-order thinking abilities that is essential for people to excel in school and later employment (Larraz-Rábanos, 2021). As a result, the majority of academics have expressed growing

interest in this topic, which has raised the profile of the subject of creative thinking and brought it closer to the center of academic discussion (Yang & Zhao, 2021).

In studies and policy documents, encouraging creative thinking is highlighted in many nations (Vincent-Lancrin, et al., 2019). The fundamental driving force behind the occurrence is the widespread acceptance of the idea that fostering students' creative thinking is key to their academic success (Akpur, 2020). There is also the argument that if students are given more freedom to explore and if more creative pedagogies are employed, they will feel more emotionally stable and engaged (Humes, 2011). However, there is little research on how creative thinking models are included and adopted in educational systems and how this affects students' ability to use their imagination (Saeed & Ramdane, 2022).

These are the Department of Education (DepEd) Orders that could serve as a relevant and practical conceptual framework for investigating the impact of creative learning on senior high school students at Dagupan City National High School (DCNHS).

DepEd Order No. 47, s. 2018 - Policy and Guidelines on the Comprehensive Implementation of the Basic Education Curriculum. According to this DepEd Order, a key component of the K–12 curriculum should be the development of 21st-century abilities, such as critical and creative thinking. It offers advice on how to incorporate higher-order thinking abilities into all subject areas to better prepare pupils for challenges in the real world.

DepEd Order No. 20, s. 2019 - Policy Guidelines on the K to 12 Basic Education Program: The significance of 21st-century skills, such as creative thinking, in the K–12 curriculum is emphasized by this arrangement. It describes how to include problem-solving, creativity, and critical thinking across courses and grade levels.

DepEd Order No. 42, s. 2016 - Policy Guidelines on Daily Lesson Preparation for the K to 12 Basic Education Program: This hierarchy places a focus on how teachers should incorporate both critical and creative thinking into their everyday lesson planning. It emphasizes how crucial it is to involve kids in activities that foster critical thinking, creativity, and problem-solving.

This study sought to investigate the impact of creative thinking on senior high school students at Dagupan City National High School (DCNHS).

Specifically, it sought to answer the following sub-problems.

1. What is the profile of the Senior High School students in terms of the following:
 - 1.1 age;
 - 1.2 sex;
 - 1.3 parents' highest educational attainment;
 - 1.4 daily allowance; and
 - 1.5 distance from home to school?
2. What is the level of creative thinking among senior high school students at Dagupan City National High School?
3. What are the factors that may influence the development of creative thinking among senior high school students at DCNHS?

4. Is there a significant relationship between the profile and the level of creative thinking of senior high school students at Dagupan City National High School?
5. Is there a significant difference between the level of creative thinking among the respondents?
6. What recommendations can be formulated based on the findings of the study?

II. METHODOLOGY

In this study, a descriptive quantitative design was utilized. A descriptive quantitative research design is appropriate for the study entitled because it allows for the collection and analysis of numerical data to describe and summarize the impact of creative thinking on senior high school students. This research design focuses on measuring variables and providing a clear picture of the phenomenon under study (Garcia & Rodriguez 2018).

The descriptive quantitative research design would enable researchers to gather data on the creative thinking abilities of senior high school students and examine how these abilities impact their academic performance, problem-solving skills, and overall well-being. By using standardized measurements and statistical analysis, researchers can quantify the level of creative thinking among the students and determine any correlations or relationships with various outcome variables (Lee, Park, & Kim 2018).

Moreover, descriptive quantitative research design provides an objective and systematic approach to data collection, ensuring that the findings are reliable and replicable. Researchers can employ surveys, questionnaires, or tests to gather data from a large sample of senior high school students in Dagupan City National High School.

III. RESULTS AND DISCUSSION

This chapter presents the results of the study based on the gathered, analyzed, and interpreted data. The results are arranged according to the order of the problems stated in the previous chapter.

Profile of the Respondents

Table 1 presents the profile of the learners in terms of age and daily allowance. It shows that the minimum age of the learners is 16 while the maximum is 20. The average age is found to be 17.06 with a standard deviation of 0.86.

In terms of the daily allowance of the learners, the minimum is 50.00 while the maximum is 500.00. The average daily allowance is Php306.65 with a standard deviation of Php109.95.

Table 1. Profile of the respondents

Profile	Statistics			
	Minimum	Maximum	Mean	Std. Deviation
Age	16	20	17.06	0.86
Daily Allowance	50.00	500.00	306.65	109.95

Table 2 shows that there was a total of 200 respondents. Among them, 95 were identified as male, which accounts for approximately 47.50% of the total respondents. On the other hand, 105 respondents were identified as female, comprising approximately 52.50% of the total respondents.

The distribution of respondents based on their sex indicated that the majority of the respondents were female, while a smaller proportion were male.

Table 2. Profile of the respondents in terms of Sex

Sex	Frequency	Percent
Male	95	47.50
Female	105	52.50
Total	200	100.0

The educational level of the respondents' parents is shown in Table 3. Out of the 200 respondents, 98, or 49.0% of the total, have completed their high school education or have successfully graduated from high school, which is the largest percentage of parents. Moving on, 90 respondents (45.0%) have parents who completed their college degree or attended a college level. 9 respondents (4.5%), a smaller percentage of all respondents, have parents who pursued education up to the master's level and earned a graduate degree at that level. The data also shows that only three respondents, or 1.5% of all respondents, have parents who have earned a doctorate degree.

Table 3. Profile of the respondents in terms of Parent's Highest Educational Attainment

	Frequency	Percent
High School Level/Graduate	98	49.0
College Level/Graduate	90	45.0
Master's Level/Graduate	9	4.5
Doctorate Level/Graduate	3	1.5
Total	200	100.0

Table 4 illustrates the profile of respondents based on the distance between their homes and schools. Out of the total 200 respondents, the majority (26.5%) reside within a 500-meter range from their school. A slightly higher percentage (25.5%) of respondents have a distance between 501 meters and 1 kilometer from their school. Another group (23.5%) falls within the range of 1.1 kilometers to 3 kilometers from their school. A smaller portion (9.8%) of respondents have a distance ranging from 3.1 kilometers to 5 kilometers. The smallest group (14.7%) lives at a distance of 5.1 kilometers and beyond from their school.

Table 4. Profile of the respondents in terms of Distance from Home to School

	Frequency	Percent
Within 500 meters range	48	26.5
501meters to 1 kilometer	66	25.5
1.1 Kilometers to 3 Kilometers	69	23.5
3.1 Kilometers to 5 kilometers	12	9.8
5.1 Kilometers and above	5	14.7
Total	200	100.0

Table 5 provides an insightful interpretation of the level of creative thinking among senior high school students at Dagupan City National High School. These students exhibit a commendable level of creative thinking, with an overall mean score of 3.89, indicating a "Very Good" performance.

The students excel in several key aspects of creative thinking, particularly in their ability to generate a wide variety of ideas (4.58) and their openness to different viewpoints (4.54). They also exhibit a strong willingness to explore unconventional ideas (4.51) and the capacity to critically evaluate their ideas (4.52).

Moreover, these students display a remarkable talent for visualizing scenarios beyond immediate reality (4.53) and understanding the perspectives and emotions of others during idea generation (4.55). They show a sense of joy and experimentation in creative activities (4.58), which is crucial for fostering creativity.

However, there are a few areas where improvement might be needed. For instance, the ability to make connections between seemingly unrelated concepts (1.99) and approach problems from unconventional angles (1.99) are rated as "Fair," suggesting room for growth in these creative thinking dimensions. Similarly, the ability to embrace nonlinear and nontraditional thought patterns (2.02) and bridging concepts from different disciplines (2.05) could be areas for further development.

Table 5. Level of Creative Thinking of Senior High School Students of Dagupan City National High School

INDICATOR	Weighted Mean	Descriptive Equivalent
1. The ability to generate a wide variety of ideas or solutions to a given problem.	4.58	Excellent
2. Creating novel and unique ideas or perspectives that go beyond conventional thinking.	4.45	Very Good
3. Being open to different viewpoints and adapting one's thinking to changing situations.	4.54	Excellent

4. Expanding on initial ideas by adding details, depth, and complexity to the concepts.	4.50	Excellent
5. Demonstrating the capacity to produce many ideas in a short amount of time.	4.48	Very Good
6. Willingness to explore unconventional or risky ideas without fear of criticism.	4.51	Excellent
7. Making connections between seemingly unrelated concepts to spark new ideas.	1.99	Fair
8. Defining problems in innovative and unique ways to uncover fresh solutions.	4.52	Excellent
9. Using metaphors or analogies to relate disparate concepts and generate insights.	4.51	Excellent
10. Displaying a strong desire to inquire, explore, and seek out new information.	2.03	Fair
11. The ability to visualize scenarios, concepts, or solutions that transcend immediate reality.	4.53	Excellent
12. Evaluating ideas and solutions critically, considering strengths, weaknesses, and potential implications.	4.52	Excellent
13. Approaching problems from unconventional angles, including thinking in reverse or opposites.	1.99	Fair
14. Combining diverse elements or ideas to create something new and cohesive.	4.50	Excellent
15. Engaging in creative activities with a sense of joy, experimentation, and play.	4.58	Excellent
16. Understanding and considering the perspectives and emotions of others when generating ideas.	4.55	Excellent
17. Reflecting on one's thinking processes and strategies to enhance creative output.	4.50	Excellent
18. Adjusting one's creative approach based on feedback and changing circumstances.	4.50	Excellent
19. Embracing nonlinear and nontraditional thought patterns to solve problems.	2.02	Fair
20. Bridging concepts from different disciplines to foster innovative solutions.	2.05	Fair
Overall Mean	3.89	Very Good

Table 6 outlines the factors that can impact the development of creative thinking among senior high school students. The table presents various indicators along with their corresponding weighted mean scores and descriptive equivalents. The first indicator highlights how the school's culture, teaching methods, and support for diverse perspectives can either facilitate or hinder the growth of creative thinking skills, with a weighted mean score of 2.02, categorized as "Low." Similarly, other factors such as the incorporation of critical thinking activities, open-ended discussions, and exposure to diverse experiences at home have corresponding low weighted mean scores (ranging from 1.91 to 2.07), all contributing to the cultivation of creative thinking. The presence of collaborative learning environments, availability of resources like libraries and technology, exposure to various subjects, and the encouragement of intrinsic motivation are discussed as additional influences on creative thinking development. Overall, the collective weighted mean score for all indicators is 2.01, indicating a "Low" level of influence on the development of creative thinking among senior high school students.

Table 6. Factors that may Influence the Development of Creative Thinking Among Senior High School Students

INDICATORS	Weighted Mean	Descriptive Equivalent
1. The school's culture, teaching methods, and encouragement of diverse perspectives can either foster or hinder creative thinking development.	2.02	Low
2. The inclusion of activities, projects, and subjects that encourage critical thinking, problem-solving, and imaginative exploration can significantly impact creative thinking.	2.05	Low
3. Educators who promote open-ended discussions, encourage risk-taking, and provide constructive feedback can inspire students' creative thinking abilities.	2.03	Low
4. Positive reinforcement, encouragement of curiosity, and exposure to diverse experiences at home can contribute to creative thinking development.	2.03	Low
5. Collaborative learning environments where students share and discuss ideas can stimulate creative thinking through the exchange of viewpoints.	2.02	Low
6. The availability of libraries, research materials, technology, and creative tools can enable students to explore and experiment with ideas.	1.91	Low
7. Cultural norms and values may shape students' perceptions of creativity and influence their willingness to engage in creative thinking activities.		

	2.07	Low
8. Intrinsically motivated students who are curious, self-driven, and passionate about learning are more likely to develop creative thinking skills.	1.93	Low
9. Exposure to a variety of subjects and disciplines can promote the cross-fertilization of ideas and the development of diverse perspectives.	2.02	Low
10. Facing and overcoming obstacles, failures, and complex problems can encourage students to think creatively to find solutions.	2.03	Low
Overall Mean	2.01	Low

Table 7 reveals several insights regarding the relationship between student profiles and their levels of creative thinking. The analysis of age shows a negligible negative correlation (-0.045) with creative thinking, indicating that as students get older, there is a slight decrease in their creative thinking abilities. However, this correlation is not statistically significant ($p = 0.525$), suggesting that age may not be a significant factor in creative thinking among these students. This observation aligns with previous research conducted by Segundo-Marcos, Carrillo, Fernández, & González (2023), which suggests that creative thinking tends to grow as children age due to cognitive development and varied experiences.

In terms of sex, the data indicates a slightly negative correlation (-0.065), suggesting that males may have slightly higher creative thinking scores than females. However, this correlation is not statistically significant ($p = 0.358$), indicating that sex may not be a strong predictor of creative thinking among these students. This result contrasts with studies by Wu-jing He (2021), which proposed that males tend to be more creative thinkers, while Zahed, Rezaisharif, & Shokri (2019) argued that women might possess greater creativity. However, the study by Inweregbuh, Osakwe, Ugwuanyi, & Agugoesi (2020) emphasizes that creative thinking is independent of gender.

Similarly, the highest educational attainment of the student's parents shows a minimal negative correlation (-0.032) with creative thinking, but this correlation is not statistically significant ($p = 0.651$), suggesting that parental education levels may not significantly influence the creative thinking abilities of these students. This finding contradicts previous research that linked higher parental education levels to enhanced creative thinking among students (Yildiz & Yildiz, 2021), although other studies (Özcan, 2022) suggest a more complex relationship between parental education and creativity.

Regarding daily allowance and distance from home to school (Distance from Home to Schoolc), the data suggests no significant correlations with creative thinking ($p = 0.262$ and $p = 0.664$, respectively). This implies that the amount of daily allowance and the distance from home to school may not be substantial factors affecting creative thinking among the students. This result differs from the research by Jankowska & Karwowski (2019) and Lu, Ding, & Nie (2023), which propose varying relationships between socioeconomic status and creative thinking.

Table 7. Tests of Relationship between Profile and Level of Creative Thinking of Senior High School Students of Dagupan City National High School

Profile	Statistics	p-value
Age ^a	-0.045	-0.525
Sex ^b	-0.065	0.358
Highest Educational Attainment ^c	-0.032	0.651
	-0.080	0.262
Daily Allowance ^a	-0.031	0.664
Distance from Home to School ^c		

^aPearson-r; ^bPoint Biserial Correlation; ^cSpearman – Rank

*Correlation is significant at the 0.05 level (2-tailed)

**Correlation is significant at the 0.01 level (2-tailed)

Table 8.1 and Table 8.2 present the results of the test of difference and post hoc analysis examining the level of creative thinking among Senior High School students at Dagupan City National High School, categorized by different academic strands: Accountancy, Business and Management (ABM), General Academic Strand (GAS), Humanities and Social Sciences (HUMMS), and Science Technology Engineering and Mathematics (STEM). The table reveals mean differences and statistical significance (Sig) between these strands.

The analysis indicates that there are no significant mean differences in creative thinking between the ABM and GAS strands (Sig = 0.938), suggesting that students in these two strands exhibit similar levels of creative thinking. Similarly, there is no significant difference between the GAS and HUMMS strands (Sig = 1.00) or the HUMMS and STEM strands (Sig = 1.00).

There is a statistically significant mean difference between the ABM and HUMMS strands (Sig = 0.927), although the actual difference is quite small (0.001). This implies that while there is a slight difference in creative thinking between students in these two strands, it may not be practically significant.

Furthermore, there is a significant mean difference between the STEM and ABM strands (Sig = 0.254) and between the STEM and GAS strands (Sig = 0.584). These differences are somewhat larger (0.051 and 0.035, respectively) compared to the other comparisons, suggesting that STEM students may exhibit slightly higher levels of creative thinking than ABM and GAS students, but again, the practical significance of these differences is modest.

Table 8.1 Tests of Difference between the Level of Creative Thinking among Senior High School Students of Dagupan City National High School

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.069	3	.023	1.210	.307
Within Groups	3.731	196	.019		
Total	3.800	199			

Table 8.2 Post Hoc Analysis of Level of Creative Thinking among Senior High School Students of Dagupan City National High School

STRAND	Accountancy, Business and Management (ABM)		General Academic Strand (GAS)		Humanities and Social Sciences (HUMMS)		Science Technology Engineering and Mathematics (STEM)	
	Mean Difference	Sig	Mean Difference	Sig	Mean Difference	Sig	Mean Difference	Sig
Accountancy, Business and Management (ABM)	-	-	-0.016	0.938	0.001	0.927	0.051	0.254
General Academic Strand (GAS)	-0.016	0.938	-	-	0.001	1.00	0.035	0.584
Humanities and Social Sciences (HUMMS)	0.001	0.927	0.001	1.00	-	-	0.034	0.607
Science Technology Engineering and Mathematics (STEM)	0.051	0.254	0.035	0.584	0.034	0.607	-	-

IV. CONCLUSIONS

From the preceding results, the following conclusions are drawn:

1. The learners' ages range from 16 to 20, with an average age of 17.06 years. learners' daily allowances, vary, ranging from Php50.00 to Php500.00, most of them were female, the majority of their parents were college graduates, and most of them live within a 500-meter range from their school.
2. Students excel in certain aspects of creative thinking, as evidenced by their "Excellent" performance in indicators such as generating a wide variety of ideas, embracing different viewpoints, adding depth to concepts, and exploring unconventional ideas without fear of criticism. These strengths indicate a commendable capacity for innovative thinking, adaptability, and a willingness to push creative boundaries. However, there is room for improvement in certain areas, as indicated by the "Fair" ratings for making connections between unrelated concepts, approaching problems unconventionally, embracing non-linear thought patterns, and bridging ideas from different disciplines. These areas present opportunities for further development, potentially fostering even greater innovation and creativity among the students.
3. All the indicators range from 1.91 to 2.97 which have a descriptive equivalent of "Low". Taken together, the cumulative weighted mean score of 2.01 indicates a "Low" overall level of factors that influence the enhancement of creative thinking among senior high school students.
4. There is no significant relationship between the profile and the level of creative thinking of the Senior High School students of Dagupan City National High School.
5. There is no significant difference in the level of creative thinking among the Senior High School students of Dagupan City National High School.

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