

## Differentiated Instruction in Mathematics: Its Effect on the Level of Critical Thinking Skills of Grade 7 Students

**Alfredo E. Dailo<sup>1</sup>, Rosana R. Dailo<sup>2</sup>**  
alfred.dailo@deped.gov.ph, rossanadailo@gmail.com  
<https://orcid.org/0000-0001-6320-3532>  
Secondary School Teacher III  
Sta. Catalina National High School  
Quezon Division  
Region IV-A (CALABARZON), Philippines

**DOI: <https://doi.org/10.54476/apjaet/59497>**

### Abstract

*This research used a quasi-experimental research design, specifically the non-equivalent control group pretest-posttest design. Cluster random sampling was used to determine the respondents of the study. The respondents of the study were Grade 7 students at Sta. Catalina National High School during the school year 2019-2020. Two sections among the Grade 7 students taking mathematics under the researcher for the school year 2019-2020 were selected as respondents – one section was used as curriculum compacting (experiment) and the other one was used as a flexible grouping (experiment). Each section had 30 students each such that the study will have a total of 60 student-respondents. This research study was conducted for five weeks and utilized McKenzie's Multiple Intelligence Survey instrument in assessing the student's multiple intelligences. The researcher crafted a 40-item multiple choice test covering the topics of undefined terms in geometry, angles, polygons, and quadrilaterals to assess the level of critical thinking skills of student-respondents. Both independent and dependent t-tests were utilized to determine the significant difference between the pre-test and post-test results of the experimental and control groups. Based on the findings, before exposing students to differentiated instructions, their level of reasoning skill was an apprentice for both flexible grouping and curriculum compacting. However, their levels of problem-solving skills were apprentice and novice, for flexible grouping and curriculum compacting, respectively. After using differentiated instruction, the student's level of critical thinking skills from both groups was at a proficient level. Findings also showed that the mean pretest and mean posttest scores of each group of respondents were significantly different for both measures of critical thinking skills. This suggested that the two forms of differentiated instruction that were employed in this study are effective in developing students' critical thinking skills, especially in discussing basic concepts of Geometry. This experimental study found that flexible grouping and curriculum compacting as forms of differentiated instruction can significantly improve the critical thinking skills of the students, then it is recommended that teachers may utilize flexible grouping and curriculum compacting as forms of differentiated instruction in Geometry.*

*Keywords: differentiated instruction, curriculum compacting, flexible grouping, critical thinking skill, problem-solving, reasoning*

## Introduction

The learning abilities of individuals vary, even if they are exposed to the same teaching methods and learning environment. Kiley (2011) emphasized that education is unique due to variations in how one studies and learns. Innovations in teaching have been implemented, but some have been inconclusive and had loopholes. In some cases, effective learning is impeded for some students, or their potential is not tapped to the fullest.

Among the skills that could enhance the potential of students for life-long learning is critical thinking. (Doyle, A. C. 2019) defined critical thinking as the formulation of reasoned judgment based on the available information. Critical thinking is the ability to distinguish between useful and less useful data, filter relevant research findings, relate important facts, and make objective observations. Inductive and deductive reasoning are essential skills for critical thinking, which can lead to solutions to problems and progress to more sophisticated ones.

Critical thinking is a very important skill that needs to be developed among people if they are to lead a good life. It is not only required in employment but also in dealing with day-to-day problems or challenges in life. Mathematics, as a subject, could very well develop the critical thinking skills of students. Solving mathematical problems, especially open-ended and situational ones, requires critical thinking on the part of the students (Henningsen & Stein, 1997 and NCTM, 2000 as cited in (Firdaus, et. al.).

## Objectives of the Study

The aims of this study are the following: 1.) To evaluate and compare the efficacy of curriculum compacting and flexible grouping approaches in enhancing the critical thinking abilities of seventh-grade students in the field of mathematics. 2.) To assess the effects of curriculum compacting and flexible grouping techniques on the mathematical multiple intelligences of seventh-grade students; 3.) To assess the efficacy of the McKenzie Multiple Intelligence Survey tool in evaluating the various intelligences of seventh-grade students in the field of mathematics, 4.) To examine the correlation between the various intelligences and critical thinking abilities of seventh-grade students in mathematics, and to ascertain whether this correlation is influenced by the two distinct teaching methodologies.

## Methodology

The study utilized a quasi-experimental research design, specifically the nonequivalent control group pretest-posttest design, to investigate the efficacy of differentiated instruction in enhancing students' critical thinking skills (Creswell, J. W. 2018). The utilization of this design was based on the selection of two intact groups from a specific grade level within a public high school located in the province of Quezon. The respondents of the study were Grade 7 students at Sta. Catalina National High School during the school year 2019-2020. Two sections among the Grade 7 students taking mathematics under the researcher for the school year 2019-2020 were selected as respondents – one section was used as curriculum compacting (experiment) and the other one was used as a flexible grouping (experiment). Each section had 30 students each such that the study will have a total of 60 student-respondents. The cluster sampling technique was used in this study. To collect the necessary data, the researcher crafted a 40-item multiple choice test covering the topics of undefined terms in geometry, angles, polygons, and quadrilaterals to assess the level of critical thinking skills of student-respondents. Both independent and dependent t-tests

were employed to ascertain the statistical significance of the differences between the pre-test and post-test outcomes of the experimental and control groups.

The researcher obtained parental consent, categorized participants into two groups, and employed distinct methods of selection and instructional techniques to optimize the capabilities of the students and the differentiated instruction. The researcher employed Walter McKenzie's Multiple Intelligence Survey instruments to evaluate the primary intelligence among the students in the flexible group, and subsequently selected the subjects for experimentation. According to the results of the Multiple Intelligence Survey, it was found that out of the participants, 9 individuals exhibited a strong inclination towards Musical intelligence, while 8 individuals demonstrated a preference for Mathematical and Logical intelligence. Additionally, 7 individuals displayed a proclivity towards Bodily-Kinesthetic intelligence, and 6 individuals exhibited a preference for Interpersonal intelligence. The participants were categorized based on their level of interest and ability to ensure that they were assigned suitable tasks. The musical ensemble was provided with a piece of music to listen to. The group focused on Mathematics and Logic and engaged in a Cross-Term Puzzle activity. The group with a bodily-kinesthetic learning style was assigned to perform a given figure, while the group with an interpersonal learning style engaged in the game "Circle Time". The researcher fostered a culture of collaboration and mutual support among participants in all undertakings.

On the other hand, the researcher considered the needs of the learners in the activities provided in the compacting group. The teacher discussed the lesson, then, asked the students to answer the given activity. Since the students need to master the lesson, their performance in the given activity became the basis if they will advance to the next lesson or will remain on the same topic.

## Results and Discussion

### 1. Level of Students' Critical Thinking Skills

The succeeding tables present the level of students' critical thinking skills in terms of reasoning and problem-solving before and after using differentiated instruction. The details are presented in Table 1-3.

#### 1.1. Differentiated Instruction in Mathematics: Its Effect on the Level of Critical Thinking Skills of Grade 7 Students

**Table 1**

*Level of Critical Thinking Skills in terms of Reasoning of the Student-Respondents before using Differentiated Instruction*

Scores	Flexible Grouping		Curriculum Compacting		Description
	F	%	F	%	
<b>22 – 28</b>	-	-	-	-	Distinguished
<b>15 – 21</b>	-	-	-	-	Proficient
<b>8 – 14</b>	19	63.33%	12	40%	Apprentice
<b>0 -7</b>	11	36.67%	18	60%	Novice
<b>Total</b>	30	100%	30	100%	

Table 1 presents the level of critical thinking skills in terms of the student-respondents' reasoning before using differentiated instructions.

As shown, the student-respondents in both groups have reasoning skill levels ranging from novice level to apprentice level. Students with the apprentice-level reasoning skills can only answer exactly what the teacher taught for they can only answer through memorization. These students are not using mathematical reasoning skills appropriately when solving the task. For example, question no. 12, “Which description does not guarantee that a quadrilateral is a square?” is a type of question that should be provided to students who are studying Mathematics, more specifically, the properties of the quadrilateral. This question needs to be elaborated properly to find the correct answer.

The student has apprentice level of reasoning skills, meaning they have difficulty analyzing mathematical problems and using available information to solve them. The experiment found that these students had deficiencies in their ability to engage in reasoning, apply mathematical principles, and use logical thinking when working with patterns and generalizing and explaining mathematical concepts.

### 1.2. Differentiated Instruction in Mathematics: Its Effect on the Level of Critical Thinking Skills of Grade 7 Students

**Table 2**  
 Level of Critical Thinking Skills in terms of Problem Solving of the Student-Respondents before using Differentiated Instruction

Scores	Flexible Grouping		Curriculum Compacting		Description
	F	%f	F	%f	
10 – 12	-	-	-	-	Distinguished
7 – 9	6	20%	-	-	Proficient
4 – 6	12	40%	10	33.33%	Apprentice
0 -3	12	40%	20	66.67%	Novice
<b>Total</b>	30	100%	30	100%	

Shown in Table 2 is the level of critical thinking skills in terms of problem-solving of the student-respondents before using differentiated instructions.

The findings of the study revealed that a significant majority (80%) of the students who participated in flexible grouping exhibited problem-solving skills at the novice to apprentice level, while a mere minority (20%) demonstrated proficiency in this area. The results indicate that a significant proportion of the student-respondents in the curriculum compacting group exhibited a novice level of problem-solving ability, while 33.33% demonstrated an apprentice level.

In a flexible group setting, students who are at the apprentice level of problem-solving skills are limited to recalling information from their memory when answering questions. Individuals at the novice level of problem-solving proficiency exhibit difficulty in recalling the instructional content conveyed by the educator. These students are unable to accurately analyze the provided questions. In question 9, students must possess an understanding of the concept and properties of quadrilaterals to provide a correct explanation and response to the given problem.

This low performance in the pre-test of the student-respondents is expected since they don't have yet the necessary knowledge of the learning competencies.

### 1.3. Differentiated Instruction in Mathematics: Its Effect on the Level of Critical Thinking Skills of Grade 7 Students

**Table 3**  
*Level of Critical Thinking Skills in terms of Reasoning of the Student-Respondents after using Differentiated Instructions*

Scores	Flexible Grouping		Curriculum Compacting		Description
	F	%f	F	%f	
<b>22 – 28</b>	2	6.67%	6	20%	Distinguished
<b>15 – 21</b>	23	76.67%	22	73.33%	Proficient
<b>8 – 14</b>	5	16.67%	2	6.67%	Apprentice
<b>0 -7</b>	-	-	-	-	Novice
<b>Total</b>	30	100%	30	100%	

Table 3 presents the level of critical thinking skills of the student-respondents in terms of reasoning after using differentiated instructions.

As presented, 83.34% of the respondents in flexible grouping have shown at least a proficient level of reasoning skill. Only 16.67% remained to have reasoning skills at the apprentice level. On the other hand, 93.33% of the student-respondents in the curriculum compacting group manifested at least a proficient level of reasoning skill and only 6.67% had an apprentice level.

Flexible grouping is a teaching approach that involves diverse learning strategies such as peer interactions and teacher guidance among students. Students with proficient reasoning skills can easily interact and remember what is taught. They can easily answer questions that follow the pattern given by the teacher. However, these students may struggle to explain how they arrived at the correct answer, despite understanding the concepts and ideas of the lessons.

In addition, the students with distinguished levels of reasoning skills are active participants in class discussions. The students under this level can easily understand and remember the topic; thus, he/she can answer the questions correctly. Moreover, they can give coherent ideas about the topic.

For example, question no. 13 needs concepts and ideas about angles to prove and explain the diagram. In this case, the student can easily provide proof and explanation about the given question.

In this instructional approach, students are categorized based on their aptitude, inclination, and proficiency level or subject matter expertise. In this scenario, the provision of explicit instruction is expected to increase as an experienced individual will oversee the learning process. The approach enables learners to advance at their individualized and inherent speed. The students are provided with information regarding the objective they are striving to achieve. Upon successfully achieving the anticipated objective, they proceeded to the subsequent concept or learning target. The engagement and progress of students are maintained due to the appropriate level of difficulty of the work and the clear identification of learning objectives. Ascertaining the learning objective and successfully achieving it can lead to a boost in students' self-assurance, thereby motivating them to continue making progress. Conversely, with regard to student grouping, the responsibility of the grouping process is assumed by the students themselves. (Smith, J. K. 2021) conducted a study to examine the efficacy of various student grouping strategies in fostering self-directed learning. The study centered on the implementation of collaborative groups, performance-based groups, and student pairs, as delineated by (Conklin, J. 2007). The objective of the study was to evaluate and contrast the efficacy of various grouping techniques in fostering self-directed learning, a crucial component of prosperous learning and growth. The study utilized a quantitative methodology, employing a quasi-experimental framework that incorporated pre-and post-tests. The findings suggest that collaborative groups and student pairs are more efficacious in fostering self-directed learning as compared

to performance-based groups. The implications of the study's findings are noteworthy for educators and practitioners who aim to improve self-directed learning and student achievement.

Curriculum compacting is an instructional strategy that can be adjusted based on the learners' needs. Students with proficient reasoning can easily answer questions but may struggle to explain how they arrived at the answer, while students with distinguished reasoning can provide substantial ideas and explanations. By adjusting the curriculum to meet individual needs, students' reasoning skills can be increased, and they can master the lesson before moving on.

After the experimentation, there is clear evidence of an increase in the level of students' reasoning skills. They demonstrated proficiency in comprehending mathematical concepts and principles that are intrinsic to various procedures. The individual has developed a set of cognitive processes that have facilitated accurate reasoning and effective problem-solving. According to (Aini, Q.2019) there exists a positive correlation between the level of students' reasoning skills and the rate at which they acquire learning competencies. This experiment suggests that the fundamental ability of mathematics is its reasoning capacity.

#### 1.4. Differentiated Instruction in Mathematics: Its Effect on the Level of Critical Thinking Skills of Grade 7 Students

**Table 4**  
*Level of Critical Thinking Skills in terms of Problem Solving of the Student-Respondents after using Differentiated Instructions*

Scores	Flexible Grouping		Curriculum Compacting		Description
	F	%f	F	%f	
10 – 12	6	20%	8	26.67%	Distinguished
7 – 9	14	46.67%	14	46.67%	Proficient
4 – 6	10	33.33%	8	26.67%	Apprentice
0 -3	-	-	-	-	Novice
<b>Total</b>	30	100%	30	100%	

Table 4 shows the level of critical thinking skills of the student-respondents in terms of problem-solving after using differentiated instructions.

Out of 30 student respondents in the flexible grouping, 66.67% showed at least a proficient level of problem-solving skill, while only 33.33% have an apprentice level. On the other hand, 73.34% of the student-respondents in curriculum compacting manifested at least a proficient level of problem-solving skill and only 26.67% registered at the apprentice level.

The students in flexible grouping with strong problem-solving skills can quickly answer questions, but struggle to explain their answers, while those with limited problem-solving abilities struggle with the order of steps required to solve problems. However, both groups demonstrate proficiency in interpreting data, arriving at solutions, evaluating inquiries, and communicating responses. The implementation of flexible grouping allowed for the development of problem-solving skills based on individual interests and resulted in advanced critical thinking skills demonstrated through substantial arguments and comprehensive explanations.

Students with proficient problem-solving skills can accurately respond to questions but may require guidance to provide detailed explanations. Those with high-level problem-solving skills can analyze and provide evidence to support assigned tasks. For item 36, knowledge of polygon properties

and the ability to analyze based on the given figure is crucial. Curriculum compacting enhances critical thinking abilities in problem-solving, as evidenced by the rise in post-test scores.

After the experiment, many students showed an improved ability to solve problems. They demonstrated proficiency in data interpretation, responding to queries and assertions, analyzing concepts, identifying arguments, engaging in independent problem-solving, and assessing inquiries. They also showed an understanding of a problem's verbal description and the ability to provide a numerical response by utilizing mathematical connections.

Students exhibiting a high level of problem-solving skills demonstrate a proclivity and pleasure in the act of problem-solving, in contrast to their counterparts with lower levels of such skills. They were able to enhance their mathematical proficiency. The individuals utilized the tools to apply their mathematical expertise toward the resolution of both hypothetical and practical problems.

## II. Differentiated Instruction in Mathematics: Its Effect on the Level of Critical Thinking Skills of Grade 7 Students

**Table 5**  
*Level of Critical Thinking Skills in terms of Problem Solving of the Student-Respondents after using Differentiated Instructions*

Scores	Flexible Grouping		Curriculum Compacting		Description
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<b>10 – 12</b>	6	20%	8	26.67%	Distinguished
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<b>0 -3</b>	-	-	-	-	Novice
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## 2. Difference between Levels of Critical Thinking Skills on the Test Scores of the Two Groups and the difference between the levels of critical thinking skills on the test scores of the two groups.

**Table 6**  
 Test of Difference Between the Levels of Critical Thinking Skills on the Pre-Test Mean Scores of the Two Groups

Critical Thinking Skills	Flexible Grouping		Curriculum Compacting		Mean Diff	95% Confidence Interval of Difference		T	df	Sig (2-tailed)
	M	SD	M	SD		L	U			
	Reasoning	7.73	2.35	7.53		2.11	0.20			
Problem Solving	4.20	1.90	3.37	1.27	0.83	-0.005	1.67	1.995	58	0.051

Legend: \*Significant at 0.05

Table 6 presents the results of the test of the difference between the levels of critical thinking skills based on the pre-test mean scores of the two groups. The results of the independent t-test demonstrate that there is no statistically significant distinction in the mean scores of critical thinking skills between the two groups during the pre-test phase ( $p > 0.05$ ). The findings suggest that students who were placed in the flexible grouping exhibit comparable levels of critical thinking abilities to those who were assigned to the curriculum compacting group.

### 2.1. Differentiated Instruction in Mathematics: Its Effect on the Level of Critical Thinking Skills of Grade 7 Students

**Table 7**  
 Test of Difference Between the Levels of Critical Thinking Skills in Terms of Reasoning on the Pre-Test and Post-Test Mean Scores of the Two Groups

Differentiated Instructions	Pretest		Posttest		Mean Difference	95% Confidence Interval of the Difference		t	df	Sig* (2-tailed)
	M	SD	M	SD		Lower	Upper			
	Flexible Grouping	7.73	2.35	18.10		3.05	10.37			
Curriculum Compacting	7.53	2.11	18.03	3.41	10.50	8.90	12.10	13.41	29	0.000

Legend: \*Significant at 0.05

Table 7 presents the results of the test of the difference between the levels of critical thinking skills, specifically reasoning skills, as indicated by the mean scores on the pre-test and post-test of the two groups. as revealed by the paired t-test data, demonstrates a statistically significant rise in the scores is significant ( $p < 0.05$ ).



This implies that the students performed better in the post-test. Their level of reasoning skills has significantly improved from apprentice to proficient level. Findings also indicated that both flexible grouping and curriculum compacting are effective methods of differentiated instruction in enhancing the reasoning skills of the students. Using two differentiated instructions, the students from apprentice level of reasoning skills improved because they learned according to their abilities and interests. The student’s ability from remembering level improved to reasoning skills where he/she can analyze, synthesize, and present their own opinions about the topic.

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According to Ghanizada’s (2020) research, engaging in argumentative discussions can enhance students' critical thinking abilities, specifically in the domains of analysis, evaluation, and inference. The research underscores the significance of teacher preparation and pedagogical planning in constructing persuasive dialogues that foster analytical reasoning. The author suggests that innovative approaches to instruction necessitate innovative approaches to assessment. This approach will allow students to respond utilizing their analytical reasoning abilities while being presented with rigorous tasks.

## 2.2. Differentiated Instruction in Mathematics: Its Effect on the Level of Critical Thinking Skills of Grade 7 Students

**Table 8**

*Test of Difference Between the Levels of Critical Thinking Skills in Terms of Problem-Solving on the Pre-Test and Post-Test Mean Scores of the Two Groups*

Differentiated Instructions	Pretest		Posttest		Mean Difference	95% CID		t	df	Sig*(2-tailed)
	M	SD	M	SD		Lower	Upper			
Flexible Grouping	4.20	1.90	7.43	1.87	3.23	2.26	4.18	6.97	29	0.000
Curriculum Compacting	3.37	1.27	7.67	2.25	4.30	3.48	5.12	10.78	29	0.000

Legend: \*Significant at 0.05

Table 8 displays the results of the statistical analysis conducted to determine the variance in critical thinking skills between the two groups, as measured by their pre-test and post-test mean scores in problem-solving. The results of the paired t-test demonstrate that the observed data exhibits statistical significance in the increase in scores for both groups ( $p < 0.05$ ). The data suggests that the problem-solving abilities of the participants have experienced a noteworthy enhancement, progressing from a novice level to a skilled level. The results indicate that the implementation of differentiated instruction is a successful approach to fostering the problem-solving abilities of students.

Kamaruddin and Hazni (2010) recognized the importance of developing problem-solving ability among individuals. Thus, they stressed that this skill be developed especially among students since it may improve their learning ability. Moreover, it will equip them in facing and solving problems as human beings.

The findings of the current undertaking are consistent with what some literature said about differentiated instructions. According to Morin (n.d.), The implementation of flexible grouping has been identified as a potent and efficacious strategy for enhancing the process of learning. This system facilitates the provision of appropriate assistance to students in a timely and effective manner. Incorporating flexible grouping into the classroom regimen allows for the normative occurrence of one or multiple students collaborating with the teacher on a designated task. Students who encounter difficulties do not experience a sense of isolation or social disapproval. Moreover, according to Gentry (2016), students who received curriculum compacting scored remarkably higher on performance and increasing achievement assessments. Winebrenner, S. (2016). In her book "Teaching Gifted Kids in Today's Classroom: Strategies and Techniques Every Teacher Can Use" (2016), she explains that curriculum compacting involves identifying and eliminating content that students have already mastered so that they can focus on new and challenging material. This strategy allows advanced learners to move at a faster pace and explore topics in greater depth, while still being challenged and engaged in their learning. Winebrenner also emphasizes the importance of differentiating instruction for all learners, including gifted and advanced learners, to meet their individual needs and help them reach their full potential.

### 2.3. Differentiated Instruction in Mathematics: Its Effect on the Level of Critical Thinking Skills of Grade 7 Students

**Table 9**

*Test of Difference Between the Levels of Critical Thinking Skills on the Post-Test Mean Scores of the Two Groups*

Critical Thinking Skills	Flexible Grouping		Curriculum Compacting		Mean Difference	95% CID		t	df	Sig*(2-tailed)
	M	SD	M	SD		Lower	Upper			
	Reasoning	18.10	3.05	18.03		3.41	0.07			
Problem Solving	7.43	1.87	7.67	2.25	0.24	-1.30	0.84	0.44	58	0.664

Legend: \*Significant at 0.05

Table 9 presents the results of the test conducted to determine the disparity in critical thinking skills levels between the two groups based on their post-test mean scores. The results of an independent t-test indicate that there is no statistically significant difference in the post-test scores for critical thinking skills, as the p-value is greater than 0.05. The findings suggest that there is no significant difference in critical thinking abilities, specifically in reasoning and problem-solving skills, between students who underwent flexible grouping and those who underwent curriculum compacting.

The result suggests that the diligent implementation of differentiated instruction by teachers in mathematics education may lead to an enhancement of students' reasoning and problem-solving abilities, commonly referred to as critical thinking skills. Consequently, this improvement in critical thinking skills may positively impact students' performance in mathematics.

The findings are in line with the literature that discusses differentiated instruction. According to (Odicta's 2017) research, students belonging to a differentiated group exhibited elevated levels of critical thinking abilities and achieved notable success in mathematics. Incorporating student interests and preferences in the learning process can enhance relevance and autonomy. (Tomlinson 2017) conducted a study that supports the notion that utilizing diverse instructional strategies to cater to students' readiness, interests, and learning profiles is crucial. She posits that differentiated instruction can enhance student motivation and engagement.

## Conclusion

The present study aimed to investigate the efficacy of differentiated instruction in Mathematics in enhancing the critical thinking abilities of Grade 7 students. The study employed a quasi-experimental research design, specifically utilizing the non-equivalent control group pretest-posttest design. The groups consisted of students who were deemed to be intact by the public high school in the Province of Quezon. The selection of these groups was carried out using the cluster random sampling technique. Based on the findings, before exposing students to differentiated instructions, their level of reasoning skill was low for both flexible grouping and curriculum compacting. However, their levels of problem-solving skills were low and very low, for flexible grouping and curriculum compacting, respectively. After using differentiated instruction, the students' level of critical thinking skills from both groups was at a high level. Findings also showed that the mean pretest and mean posttest scores of each group of respondents were significantly different for both measures of critical thinking skills. This suggested that the two forms of differentiated instruction that were employed in this study are effective in developing students' critical thinking skills, especially in discussing basic concepts of Geometry.

The study suggests that the implementation of differentiated instruction techniques such as flexible grouping and curriculum compacting can lead to a significant improvement in students' critical thinking skills. Therefore, it is recommended that Geometry teachers consider utilizing these techniques in their instruction.

## Recommendations

Based on the findings of the study, it is recommended that differentiated instruction in the form of flexible grouping and curriculum compacting be implemented as they have been shown to have a significant positive impact on student's critical thinking abilities.

1. Educators are advised to incorporate flexible grouping and curriculum compacting as means of differentiated instruction, not only in Mathematics but also in other academic domains.
2. Educators can explore additional facets of differentiated instruction to effectively execute this approach.
3. Teachers are encouraged to be more innovative and used a tiered approach to identify if the critical thinking skills are more likely to be flexible grouping.
4. Future researchers are encouraged to replicate this study to three or more groups and use differentiated instruction other than flexible grouping and curriculum compacting.

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