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Research Paper

Impact of Using the Positive Thinking Learning Strategy on Math Achievement and Problem-Solving for Tenth Grade Students in Jordan

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ABSTRACT

The study aimed at investigating the effect of using positive thinking strategy on the achievement and mathematical problem solving for 10th grade students in Jordan, the sample of the study consisted of 101 students, divided into two groups: experimental group (taught by positive thinking strategy), and control group (taught by traditional strategy). To achieve the aims of the study, the researcher molding a strategy for teaching mathematics include self-talk, decision-making, imagination, problem-solving, benchmarking. In addition, the tools of the study consists of mathematical achievement test, it is validity and reliability was verified, and the problem solving test aims to explore the aspects: transfer and translation, error identification and correction, open-end cases, mentioning the reason, proof, connection between present and previous information, logical justification, also the validity and reliability was verified. The results of the study showed the experimental group outperforming the control group in both academic achievement and problem solving. In light of the study results, the researcher recommends the necessity of using positive thinking strategy when teaching mathematics.

Keywords: *problem solving, achievement, positive thinking, students, learning strategy*

INTRODUCTION

Math is a basic aspect of the school curriculum. It requires developing the students' thinking abilities and problem solving in different topics, such as geometry, algebra, statistics, probability and measurement (NCTM, 2000). It also plays a vital complementary role in solving problems related to other fields of knowledge, like economics, physics and all areas of engineering. In addition, it is believed to serve other disciplines, by means of providing math skills and principles, as well as developing cognitive and metacognitive thinking (Abu-Zeina, 2003).

Therefore, it is necessary to reconsider the components of the math curriculum, in terms of objectives, teaching strategies, content and assessment strategies. This needs to be done according to developments related to technology and geopolitical factors (Arab Open University, 2006). Furthermore, research shows a vital role of such improvement in identifying the strengths and weaknesses of the curriculum. For instance, the 2015 Trends International Mathematics and Science Study (TIMMS) indicate that the Jordanian students occupied late positions, with an average less than the median by about 114 points (ERA, 2015).

According to the National Council of Teachers of Mathematics (NCTM, 2000), one of the international principles of teaching math is teaching. It concentrates on employing modern and developed strategies which make the learner involved, active and keep thinking as well as on appropriate learning activities which observes individual differences between students. In Jordan, students encounter educational problems related to math in terms of mastering math skills and the problem-solving ability.

Many of them suffer from academic learning difficulties. Thus, math difficulty specialists have become more interested in the issue. Such students show these problems in later school stages, as they basically arise in the field of academic education (Almojaidel & Alyafay, 2009).

Among the new approaches of teaching math is the significance of caring for all student categories, since individual differences between students are very clear (Obeid, 2004). For instance, many achieve tasks faster than others, while some need more explanation and further training and activities. Therefore, the teacher is expected to observe this by diversifying curricular and extra-curricular activities as well as increasing their motivation to learning through accomplishment and higher levels of expectation.

There is a modern strategy which plays a great role in reducing students' anxiety during learning. Positive Thinking refers to the individual's consciousness of assessing his/her thoughts and beliefs as well as

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controlling and directing them to achieve his/her expectations of successful results. It can also support problem-solving through composing logical, mental systems and patterns of an optimistic type. Furthermore, positive thinking represents the activities and techniques employed by the individual to solve problems through constructive mental convictions, along with self-leadership thinking strategies, in a bid to enhance the individual's confidence of success by means of the above optimistic mental systems and patterns (Ebrahiem, 2006).

According to Neck & Manz (1993), positive thinking is the individual's possession of a number of positive expectations of the future as well as conviction of the ability to succeed, especially "I believe I can".

Upon the researcher's observations in school and university education, among the difficulties faced by students in solving math problems is fear of the inability to answer, which makes them feel worried and then they lose their self-confidence to answer. Here, it is advised to give the students the opportunity to participate in activities through certain programmes and receive help from others. Simple and then complex activities shall be organized. In the meantime, the learner's self-confidence in his/her ability to answer shall be enhanced, by planning for what is known and unknown as well as any expected relevant problems.

Positive thinkers are said to refuse defeat, have a serious desire for change, focus on their successes, enjoy perseverance and have tendency and motivation to prove themselves and improve their images (Alqatami, 2001). For Khatib (2003), they also employ the self-talk strategy, enabling them to control and evaluate internal thoughts and convictions which steer their expectations about succeeding in solving problems. Self-talk also boosts the individual's self-management ability of thinking in different ways to become more conscious in guiding the directions of the thinking processes.

Breshia (2002) refers to several recent programmes which raise the individuals' competence, as in using the above strategies. They come under different headings, such as Inner Power Programs and Recreating Peak States Instantly, making the individual feel active and happy (www.instantinnerpower.com).
There are various positive thinking strategies (Ebrahiem, 2006; Jaber, 2005), including:

1. **Self-talk:** This refers to the mental interaction between the individual's thoughts and convictions, in order to determine his/her position and ability to solve a certain problem in the current situation and decide what should be done. This internal dialogue is believed to be so important in modifying behaviours and thoughts.
2. **Benchmarking:** This refers to comparing and contrasting between objects, relations and phenomena.
3. **Imagination:** This refers to using fancy and mental images to expand understanding. Here, all the senses are employed to help in free perception and generating as many as possible of thoughts.
4. **Problem-solving:** This refers to a type of thinking which requires a skill based on practice and training. It could be taught in curricula.
5. **Decision-making:** This refers to the ability to interact with situations encountered by the individual, applying a critical and more inclusive perspective to reach a sound decision.

In math, the above strategies may be applied to provide the learner with a conviction of his/her ability to do math tasks and skills. He/she can also realize obstacles and how to overcome them. As for imagination, it enhances the learner's involvement in tasks and activities by using all the possible learning patterns (visual, auditory and kinesthetic). That would increase the learner's motivation to learn by applying problem-solving strategies, such as using and linking math rules and principles, discovering patterns, experiment, trial and error and simplification, all within a framework of thinking and scientific steps of problem-solving. With regard to decision-making, this is the ultimate level of thinking. Here, the learner can choose the best solution, adopt diverse ways and determine what is right and wrong, which would lead to a creative thinker and critic. Straightforward procedures may be developed for the positive thinking strategy, by merging the aforementioned strategies in the following stages:

First Stage (identifying the problem): Determine the data, target, expected solution strategy, principles and generalizations necessary for the solution. Here, the teacher's role centers on encouraging the student to analyze and comprehend the issue.

Second Stage (creating ideas with absolute freedom and high expectations): The student begins to connect his/her own information and experience to the solution, proposing expected ways without anxiety or fear. Here, the teacher's role is about raising the students' level of expectations for success, suggesting other solutions, in case of failure, understanding problems and attempting to solve them.

Third Stage (finding solution/solutions): The students suggest possible solutions. The teacher asks them to evaluate them and take a decision.

Problem-solving is a vital activity carried out at different levels of complication, whenever one is entrusted with an assignment, a decision in a certain issue or appropriate sensible solutions to daily problems. It prerequires freedom of thinking, ability for contemplative thinking, ability for criticism and motivation (Hussein & Fakhro, 2002).

Therefore, problem-solving may be defined as the production of new and diverse (or multiple) relations and solutions to problems and math exercises. It goes beyond typical solutions based on knowledge and experience, provided that there is no earlier agreement on value judgements.

Math problems are seen in the inability to change from one form to another. For instance, when solving geometric problems, many students are weak in identifying data from the required element. Others find it difficult to set the data in a drawing form. A third type cannot tell right from wrong statements (critical thinking), due to their inability to link the data to the required element as well as the weakness of their geometric logic and proof (Hashash, 2004; Alnahar, Adass & Abulibdeh, 2000; Obeidat &Abul-Sameed, 2002; Al-Masri, Alnahar & Abulibdeh, 2002).

There are several studies on the relation between positive thinking, on the one hand, and math achievement and solving math problems, on the other. Alina (2018) explored the impact of a training programme for master students in providing an appropriate learning environment and observing the students' emotional and social requirements. Students are encountered by problems arising from the socio-economic situation, which significantly affects families and, thus, leads to genuine difficulties in learning and achievement. Among the objectives of the programme was offering educational experience to create an appropriate educational environment which boosts fun and entertainment during learning.

On the impact of positive thinking in treating some diseases, Mariam and Gholamreza (2017) conducted a study on the effectiveness of positive thinking skills on life expectancy and self-image for those who suffer from multiple sclerosis. The sample consisted of 30 patients in Tehran, who were divided into two groups. While the experimental group was sufficiently trained on positive thinking skills, the control group did not receive any training. The results showed that this kind of training enhanced self-image, life expectancy and self-awareness.

Also on the impact of positive thinking in devolving management kills Ebraheem (2019) conducted a study to create more positive thinking assist youth on developing mental efforts and business following by right decision to get- out with positive thinking in individual life in order to help them to throw non-positive ideas which hinder their planning power thinking that assist them to solve problems occur now and in the future which enable self-person to cooperate effectively dealing with requirement challenge and of daily life and intellectual over developmental community and administrative.

Farkhondeh et. al. (2017) investigated ways to reduce conflict and boost the effectiveness of positive thinking, happiness and self-efficacy for secondary school students in the city of Choram on a sample of 60 students. The study adopted the experimental method by dividing the students into two groups: experimental and control. According to the results, positive thinking has an impact in increasing happiness and feeling of self-efficacy, as well as reducing inner conflict for both males and females.

Atoum & Hadad (2015) conducted a study on the impact of positive thinking in reducing exam anxiety for Jordanian students.

To this end, the researchers developed a training programme based on positive thinking strategies. The sample of 60 secondary school students was divided into two groups: experimental and control. The results showed a positive impact of the scheme in reducing exam anxiety.

Alshamri & Algorashi (2018) examined the impact of the Willen and Phillips' positive thinking strategy for fifth graders in the Science subject in the city of Wasit, Iraq. The quasi-experimental method was used. According to the results, the experimental group which received training on positive thinking through the Willen and Phillips' strategy excelled in developing metacognitive skills. In addition, the approach boosted the learner's ability to organize thoughts and highlight basic ideas.

Positive thinking could be one of the significant learning outcomes and educational objectives. Mahmoud (2013) explored the impact of the peer-learning strategy in developing positive thinking and self-esteem for Egyptian basic education students with high and low achievement. The results showed that the peer-learning strategy increased the students' positive thinking and self-esteem.

Problem of the study

The results of international studies in 1999, 2003, 2007, 2011 and 2015 indicated Jordanian basic education students' declining achievement in math. One of the aims for developing curricula in Jordan is to introduce teaching strategies in light of modern technology.

Therefore, it is necessary to reconsider teaching methods, content and ways to perform classroom activities.

Students are also found to be weak in solving non-routine problems, which require the learner to connect data in a bid to come up with unconventional solutions. One of the issues facing school students is the focus on routine problems related to simple skills. When they are subject to problems which require high thinking and multiple skills, many of them ignore them as they believe they are above their level. As a result, the positive thinking strategy is suitable for developing the problem-solving ability and achievement. It concentrates on comparison and trial. It also improves the learner's problem-solving strategies, such as looking for patterns, trying special cases, making tables, creating math equations and going in reverse steps. Furthermore, it emphasizes the learner's ego through the ability to find solutions and identify obstacles to the solution.

Questions of the study

1. What is the impact of using the positive thinking learning strategy in math achievement for tenth grade students in Jordan?
2. What is the impact of using the positive thinking learning strategy in the ability to solve math problems for tenth grade students in Jordan?

Concepts of the study

Positive thinking strategy: This refers to a set of procedures and steps taken by the math teacher inside and outside the classroom aimed at developing positive attitudes for the learners to their self-efficacy through the following sub-strategies:

Self-talk: This refers to the mental interaction between the individual's thoughts and convictions, in order to determine his/her position and ability to solve a certain problem in the current situation and decide what should be done. This internal dialogue is believed to be so important in modifying behaviours and thoughts.

Benchmarking: This refers to comparing and contrasting between objects, relations and phenomena. Imagination: This refers to using fancy and mental images to expand understanding. Here, all the senses are employed to help in free perception and generating as many as possible of thoughts.

Problem-solving: This refers to a type of thinking which requires a skill based on practice and training. It could be taught in curricula.

Decision-making: This refers to the ability to interact with situations encountered by the individual, applying a critical and more inclusive perspective to reach a sound decision.

Ability to solve problems: This refers to the making of new and diverse relations and solutions to problems and geometric exercises in a way which is independent and unknown before. Relevant subcomponents could be listed as follows: transfer and translation, error identification, mentioning the reason, complete proof, logical justification and open-end and unfamiliar cases. These are measured by the students' marks for the ability to solve geometric problems test in the present study.

Achievement: This refers to a set of math conceptions, generalizations and skills included in the Analytical Geometry units after being learnt. These are measured by the students' marks for the achievement test of the present study.

Limitations of the study

The study is limited to the following:

- Tenth grade students of Amman schools, registered in the academic year 2019/2020
- Validity and reliability of the test concerned with achievement and problem-solving ability
- Use of problem-solving (only) as a positive thinking strategy

Significance of the study

The significance of the study lies in using the positive thinking strategy in improving math achievement, as well as accomplishing the educational outcomes, such as the learner's problem-solving ability. The NCTM (2000) stresses problem-solving as one process criterion and the reduction of anxiety for learners during studying and performance of tasks. The positive thinking strategy is believed to affect the learner's conviction and help him/her in imagination, decision-taking, problem-solving and benchmarking.

The study also has practical significance in providing programmes and guidelines for math teachers, aimed at raising awareness of modern teaching strategies which benefit students.

Models of math lessons in Analytical Geometric will be presented to teachers in public and private schools. This strategy is, more particularly, expected to help those who teach math to students with a high math anxiety.

METHODOLOGY

Subjects of the study

The sample consisted of 101 tenth grade students of Amman, Jordan schools who are registered in the academic year 2019/2020. The four chosen sections were divided into one experimental group (50 students) and another control group (51 students).

Tools of the study

To explore the impact of the positive thinking strategy in math achievement and problem-solving, the following tools were prepared:

Achievement Test:

The test aimed at measuring the individuals' instant achievement in the two Analytical Geometry units. The 30 multiple-choice statements measured cognitive levels (knowledge, understanding, application and high mental levels). As the grand total is 30, 1 is given to the right answer and 0 to the wrong answer. The test was subject to the following steps:

- Setting the behavioral objectives measured by the Analytical Geometry units
- Analyzing the units' content to concepts, generalizations, skills and answers to questions
- Using the internal Cronbach's Alpha consistency test to check reliability, and the reliability coefficient was 0.86
- Presenting the test to a number of referees specialized in math teaching methods to check the validity of statements in terms of suitability and accuracy, and their comments were taken in to consideration.

Problem-solving ability test:

A problem-solving ability test was set according to a number of previous studies and tests on the topic (Abu-Zeina, 2003; Lim & Moore, 2002; Walter, 2004; Karen, 2005; Alsup, 2005).

The test consisted of 8 aspects:

a) Transfer and translation: Here, the student is asked to translate a verbal problem to data and required element or vice versa, as well as translate a question to a drawing or vice versa.
b) Error identification and correction: Here, the student is given answers with technical mistakes, which the student should spot and rectify.
c) Open-end cases: Here, the student is required to answer in different ways. The method aims at making the student used to solve problems in diverse ways other than those familiar to him/her.
d) Mentioning the reason: Here, the student is given solved problems to determine the reasons which caused the results. The aim is to enhance the student's sensible conclusion, according to previous information, whether given in the question or based on other definitions, axioms or theories.
e) Proof: Here, the student is given a geometric problem and asked to identify data, required element and full proof.
f) Connection between present and previous information: Here, a student is given geometric problems and asked to solve it according to the provided information as well as those previously studied in other units. The aim is to link the old and new materials in geometry.
g) Logical justification: Here, the student is given geometry statements and asked only to identify any logical error.
h) Unfamiliar cases: Here, the student is given geometry statements and asked to use an untypical pattern of solution from outside the problem, add other details and try to make representation in the 2nd and 3rd dimensions.

On the one hand, the validity of the test was checked by a number of referees, who are experts in math teaching methods (4 university faculty members and 4 educational supervisors). On the other hand, to check the reliability of the test, the reliability coefficient was calculated by Cronbach's Alpha (α), and was found as 0.78.

Teacher's Guidebook for the Analytical Geometry Units

The Teacher's Guidebook was prepared in accordance with the positive thinking strategy. The teacher was supposed to give a warm-up exercise at the beginning of the class to motivate the students and trigger their interest. Then, he/she gave the problem and asked the students to put it in a solvable procedural form and tell the data and required element. He/she divided them into small, cooperative groups which include different achievement levels. After that, the students expressed thoughts and made suggestions of appropriate solutions. This is when positive thinking lied, taking the form of freedom of thought, giving solutions without limits, building and exchange of ideas and, then, evaluating and classifying thoughts. Finally, the teacher and students excluded illogical thoughts and reached a solution to the problem.

Variables of the study

Independent variable: This refers to the teaching strategy, which is of two levels:
-Positive thinking strategy
-Conventional method (lecturing)

Dependent variables: In this study, these refer to the following:
-Achievement in the Analytical Geometry Units
-Problem-solving ability

Adopted statistical design

To answer the questions of the study, Arthematic means, standard deviations, frequency distributions and the two-way analysis MANCOVA test were used to compare and contrast between the means of the experimental and control groups.

Procedures of the study

- Investigating literature on positive thinking stages and the problem-solving ability in math
- Analyzing the content of the Analytical Geometry units for tenth grade students to identify the included math concepts, generalizations and skills, solving problems and finding the analysis reliability
- Setting an achievement test for the units in question, presenting it to referees, applying it to an exploratory sample to determine its application time, reliability coefficient and statements' ability for differentiation and difficulty coefficients
- Setting a problem-solving ability test through previous Analytical Geometry lessons and exams, applying it to the aforementioned exploratory sample, presenting it to referees, calculating its reliability, validity, difficulty coefficients and statements' ability for differentiation
- Selecting the community of the study in a purposeful manner and then randomly classifying them into control and experimental groups, while securing equality in some variables like the achievement test of the previous year
- Training the experimental teacher on how to teach through the positive thinking strategy
- Teaching the Analytical Geometry units to the experimental group through the positive thinking strategy by using the Teacher's Guidebook prepared by the researcher, while teaching it to the control group in the conventional method
- Finally, applying the achievement test and problem-solving ability test to both the experimental and control groups
- Analyzing the results of the study
- Making suggestions and recommendations

Adopted statistical methods

1. Arithmetic means, standard deviations, frequency distributions when using the descriptive statistics of the results of the study
2. Two-way analysis MANCOVA test to answer the questions of the study

RESULTS AND DISCUSSION

The study aimed at exploring the impact of the positive thinking learning strategy in math achievement and problem-solving for tenth grade students in Jordan.

For Question 1:

1.What is the impact of using the positive thinking learning strategy in math achievement for tenth grade students in Jordan?

The Arthematic means and standard deviations of the students' math achievement marks were calculated for the experimental and control groups, as is shown Table 1 below:

Table1. Arthematic means and standard deviations of the students' marks in the math achievement test for the experimental and control groups

Gender	Group	Number	Median	Standard deviation
Males	Experimental	23	58.82	9.92
	Control	24	47.95	7.40
Females	Experimental	27	58.18	11.41
	Control	27	45.62	7.79
Total	Experimental	50	58.48	10.64
	Control	51	46.72	7.63

The above table shows that the median of the students' achievement marks in the experimental group is 58.48 and the standard deviation 10.64. In the control group, the median is 46.72 and the standard deviation 7.63, rising by 12.

To explore the significance of differences between the medians of the experimental and control groups' marks in math achievement, the two-way analysis MANCOVA test was applied, as is shown in Table 2 below:

Table2. Results of the two-way analysis MANCOVA test for the differences between the Arthematic means of the experimental and control groups' marks in math achievement

Source of variance	Sum of squares	df	Mean Square	F	Sig.
Covariant	5007.22	1	5007.22	142.158	0.000
Group	2873.77	1	2873.77	81.588	0.000
Gender	0.058	1	0.058	0.002	0.968
Group*gender	9.399	1	9.399	0.266	0.607
Error	3381.405	96			
Total	290805	101			

The above table shows that there is a statistically significant difference ($0.05 \geq \alpha$) between the Arthematic means of the experimental and control group′s marks in favour of the former. The value of F (81.588) is statistically significant at ($0.05 \geq \alpha$).

The results may be attributed to the effectiveness of the positive thinking strategy. It is effective in teaching math because it promotes positive attitudes to math and plays a vital role in developing achievement depending on the teacher's activeness, direct experience, self-actualization and improvement of self-efficacy in achieving the learning objectives. Among the top features of this strategy is that it develops planning, evaluation and decision-taking abilities.

The results may be attributed to the effectiveness of the positive thinking strategy based on high expectations of success. The strategy boosts the learner's self-confidence and makes him/her try several times to reach a solution (Neck & Manz, 1993).

According to Alqatami (2001), positive thinkers reject defeat, have a strong desire for success, by identifying their mistakes and looking for remedial solutions. They look for the defect in the inability to solve problems and then retry different solutions. This is provided by the positive thinking strategy in the skills of self-learning, self-assessment and self-talk, until taking a decision about the learning method and problem-solving.

For Question 2:

2. What is the impact of using the positive thinking learning strategy in the ability to solve math problems for tenth grade students in Jordan?

The Arthematic means and standard deviations of the students' math problem-solving ability marks were calculated for the experimental and control groups, as is shown the Table 3 below:

Table 3. Arthematic means and standard deviations of the students' marks in math problem-solving for the experimental and control groups

Gender	Group	Number	Arthematic means	Standard deviation
Males	Experimental	23	24.95	8.83
	Control	24	59.21	9.22
Females	Experimental	27	35.78	9.87
	Control	27	72.70	8.26
Total	Experimental	50	30.8	10.79
	Control	51	66.35	10.99

The above table shows that the median of the math anxiety marks of the experimental group is 30.8 and the standard deviation 10.79. In the control group, on the other hand, the median is 66.35 and standard deviation 10.99, dropping by 35.55.

To explore the significance of differences between the Arthematic means of the experimental and control groups' marks in solving math problems, the two-way analysis MANCOVA test was applied, as is shown in Table 4 below:

Table 4. Results of the two-way analysis MANCOVA test for the differences between the Arthematic means of the experimental and control groups' marks in solving math problems

Source of variance	Sum of squares	df	Mean Square	F	Sig.
Covariant	1292.603	1	1292.603	18.558	.000
Group	32876.634	1	32876.634	472.012	.000
Gender	759.179	1	759.179	10.900	.001
Group*Gender	28.751	1	28.751	.413	.522
Error	6686.608	96	69.652		
Total	283718.000	101			

The above table shows that there is a statistically significant difference ($0.05 \geq \alpha$) between the Arthematic means of the experimental and control groups′ marks in favour of the former in solving math problems. The value of F (472.012) is statistically significant at ($0.05 \geq \alpha$).

The results may be attributed to the effectiveness of the positive thinking strategy. It helps boost the learner's ability in solving math problems in Analytical Geometry topics. It provides relevant programmes and sub-strategies, such as looking for patterns, trying simpler problems, using equations and laws, and trial and error.

For Lang et. al (2018), positive thinking enjoys a positive relation to academic achievement in math, by means of increasing the learning memory's activeness and the use of the working memory. Deep thinking is associated with a positive attitude to learning, especially in the case of math. Alqatami (2001) refers to the importance of perseverance and tendency to achieve targets by students with positive thinking.

The above results agree with a study conducted by Khatib (2003), which recommended training students on positive thinking to generate a conviction that they are able to succeed and achieve targets. It is also noteworthy here that positive thinking is a significant learning outcome in math and a skill which requires training, as is argued by several scholars (Alshamri & Algorashi, 2018; Mariam and Gholamreza, 2017). Moreover, the conclusion goes in line with Alina's (2018) argument of the necessity of securing a suitable learning environment to overcome the students' problems and attempt to improve their achievement.

Problem-solving is necessary for the learner's life, since it is an outcome of learning math in the 21st century and associated with both the individual's ability to face life issues and capability for production and creativity. The positive thinking strategy can develop the problem-solving skills, the abilities for planning, comparison and imagination and create feelings of the problem-solving ability. That would make positive attitudes to math and increase the students' motivation for learning (Ebrahiem, 2006).

Solving math problems is viewed as an intellectual activity related to induction, inference, guessing, modelling and coding, which are mental skills in need for a cognitive, thinking and emotional reserve. Positive thinking affects the problem-solving ability by providing strategies which are appropriate and motivating and triggers thinking and creativity.

RECOMMENDATIONS

- Adopting a learning strategy based on positive thinking when teaching geometry topics in math textbooks
- Training math teachers on modern strategies, like positive thinking, to boost their abilities for math achievement
- Improving the students' math achievement and ability to solve math problems, by means of providing resources and support to both students and teachers as well as a classroom environment which motivates learning
- Conducting further research on the development of other outcomes, such as creative, critical and metacognitive thinking.

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