The Use of Problem Solving Strategy and Its Role in Increasing 1st Year Middle School Students' Levels of Academic Achievement According to the Teachers' Attitudes

A Field Study in Some Middle Schools -Jijel-

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Abstract:
The current study aimed at identifying the use of problem solving strategy and its role in increasing first middle school students' levels of academic achievement. A field studyconducted in some middle schools in Jijel.
The researcher applied a descriptive analytical approach using a questionnaire as a research instrument designed for a randomly selected sample of 68 teachers. She utilized thestatistical packaging programme and came up with the following results,
-The use of problem solving strategy contributes to increasing the first year middle schoolstudents' academic achievement according to the teachers' attitudes.
Sub-Hypotheses:
-The students' ability to feel the problem contributes to increasing their level of academicachievement.-The students' ability to identify the problem contributes to increasing their level of academic
achievement.
-The students' ability to put hypotheses for the problem contributes to increasing their level of
academic achievement.
-The students' ability to gather information about the problem contributes to increasing their
level of academic achievement.
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Keywords: strategy, problem solving strategy, academic achievement.

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1 - Introduction

Education is considered as essential for the development of societies in all means since ages. It plays an important role in preparing people to face the 21st century challenges and to be able to keep pace with cognitive and technical development.

Due to the need for learning about the different areas in life, since ages, learning emerged. People recognized that they must confront the various problems they face in life through learning. Therefore, they started developing the ways they learn things so that they keep pace with the changes they live. In the past, teachers used to teach from the textbooks designed by the custodians based on lecturing, presenting, filling and repeating. Therefore, this latter may make students not able to acquire any knowledge or skills except for memorization and listening, a situation which led educators to think of new methods and strategies for teaching. They, then, found a more effective teaching approach based on teaching competencies. To be applied, there was a need for modern tutoring strategies which enable students to show their capacities and improve their cognitive skills. Among those techniques, problem solving is considered as effective in teaching and training since it helps students to find solutions themselves through making research, to analyse and to organize their ideas; consequently, it increases the students' levels of academic achievement.

.1.1- Research Problem:

Teaching Process is based on many foundations and postulates. Teachers use different ways, methods and strategies in the processes of teaching and learning and in the interaction between them and their students so that they reach the teaching goals. These strategies differ from one subject and its goals to the other. They include the styles and plans teachers usually use which determine the appropriate atmosphere and circumstances for teaching as well as the nature of activity between tutors and their students. Besides, modern educational philosophies focus, in their approaches, on the use of modern teaching methods that make students more interactive and active during the learning process; for instance, six thinking hats, brainstorming, and problem solving strategies.

This strategy is based on the idea that teachers choose the most suitable tasks for their students carefully. Then, to solve these tasks, they divide the roles between the students according to their capacities providing books and necessary resources which help them to gather the required information to do so. This technique encourages active learners and gives a hand to lazy ones. (Abu Zaid, 2013, p. 47)

It encourages students to make research and discover knowledge themselves through solving the given problems since it puts students in a real life situation where they need to use their brains in order to arrive at a knowledge balance. (Nihan, 2008, p. 199)

It promotes making research, questioning and experimenting, which represents the highest level of the scientific activity. Additionally, it aids students to find out things themselves through a scientific reading. John Dewey in his book 'How to Think', laid the foundations for the use of this strategy. He mentioned that problem solving strategy drives students to acquire new knowledge and improve their cognitive skills which may increase their academic achievement. This latter refers to the learner's ability to understand the subjects prescribed in the school programme in terms of knowledge and skills. That is to say, students learn a set of knowledge and the way how to apply it. Their ability to apply it is determined through the oral and written exams they have in all the school subjects i.e. the total score. To conclude, this strategy is considered as an indicator for the success of the educational process. (Wanjan, 2014, p. 53)

Dewey hypothesized that thinking is the best way through which one may solve a problem. Besides, analytical thinking is considered as the finest type of thinking because it requires the analysis of facts before judging their correctness. He classified thinking, logically speaking, into five phases: feeling and identifying the problem, collecting data, making the hypothesis, testing the hypothesis, checking its correctness and finally coming up with the results. In addition, problem solving strategy is related to the increase of academic achievement. Researchers see academic achievement as the scores got by the student in exams and a manifestation of cognitive development. It is influenced by so many interrelated complex factors and it is one of the manifestations of the cognitive development of the child. In fact, academic achievement receive great attention from psychologists, educational researchers and sociologists because the educational process is no longer seen as only a service but also an investment which is not distinguished from other fields of investment like economics and it is of capital importance in the students and their families' lives; not only passing the successive phases in their studies successfully and getting the necessary grades to do so but also having importance in other areas of life since it is an obligatory step students must go through. (Al Hamoudi, 2010, p. 176)

Problem solving strategy plays an important role in increasing students' academic achievement among middle school students. The progress students make is through work and not repetition and imitation, which have become widely used to teach, and this resulted in low levels of students. In this vein, Salibi (2007) in his study mentioned that teachers fall short teaching when using imitation. This latter focuses mainly on teaching only knowledge, which led to the point that people started thinking that the goal of imitation is to increase knowledge, while it neglects teaching skills, attitudes and self-learning which decreases students' academic achievement. (Abu Awad, 2015, p. 5)

In this study, the researcher tries to identify the use of problem solving strategy and its role in increasing academic achievement according to the teachers' attitudes who already use it.

The general question of the current study is ‘does the use of problem solving strategy increase the academic achievement among middle school students according to the teachers’ attitudes?. It forks to a set of sub-questions as follows,
-Does students’ ability to feel the problem contribute to increasing their level of academic achievement?
-Does students’ ability to identify the problem contribute to increasing their level of academic achievement?
-Does students’ ability to put hypotheses for the problem contribute to increasing their level of academic achievement?
-Does students’ ability to gather information contribute to increasing their level of academic achievement?
-Does students’ ability to find out a solution for the problem contribute to increasing their level of academic achievement?

Second: The Procedural Identification of the Study Variables:
1/ Problem Solving Strategy:
Procedural Definition: It is one of the modern teaching strategies. It requires mental activity and thinking. Besides, using this strategy, students learn by themselves and so they have a positive role in the learning process. They get opposed to an exciting educational situation and they deal with it and find solutions as well based on the previous experiences they had. Students follow a set of steps to solve that problem: feeling the problem, identifying the problem, putting hypotheses, and arriving at solutions for the problem under the teachers’ observation.

2/ Academic Achievement:

Procedural Definition: It refers to what students learnt from the courses they had and their ability to apply this knowledge. It can be identified through the different exams they have at the end of the course.

Third: The Reasons Why the Study Was Conducted
-Drawing middle school teachers for the importance of using problem solving strategy and varying the teaching methods.

-Encouraging teachers to use problem solving strategy as one of the modern methods of teaching which improves scientific, creative and critical thinking and increases academic achievement.

-staying away from the traditional methods of teaching which is mainly based on filling and imitation.

-Providing students with a motivating interactive learning atmosphere to acquire skills of making decisions and guiding self-learning.

Fourth: Aims of the Study

-Identifying the role of using problem solving strategy in increasing the levels of academic achievement.

-Identifying the extent to which students are able to feel the problem and its role in increasing their levels of academic achievement.

-Identifying the extent to which students are able to determine the problem and its role in increasing their levels of academic achievement.

-Identifying the extent to which students are able to put hypotheses for the problem and its role in increasing their levels of academic achievement.

-Identifying the extent to which students are able to gather information about the problem and its role in increasing their levels of academic achievement.

- Identifying the students' ability to come up with the solution for the problem and its role in increasing their levels of academic achievement.

Fifth: The Importance of the Study

-The results of the study draw middle school teachers' attention to the role of using problem solving strategy in increasing the learners' academic achievement.

-The role of using problem solving strategy in teaching. It makes students use their brains to deal with the tasks and come up with their solutions which increases the level of their academic achievement.

Sixth: Background of the Study

Sudan Mahmud aimed at investigating the effect of using brain storming and problem solving strategies on academic achievement during history and geography sessions. The researcher applied an experimental research design on a randomly selected sample of 189 4th year middle school students. The researcher divided the sample into two groups. An experimental group divided itself into two; in one, he tested problem solving strategy and in the other, he tested brainstorming. On the other hand, there was a control group studied using the usual strategies. The results showed that there are no differences at the significance of 0.05 between the students' exam grades mean in the experimental group using problem solving strategy and the control group. In addition, there were differences at the significance of 0.05 among the experimental group using problem solving strategy between the students' grades in the exam they had before and the one they had after. Another result obtained was that there is no stastically significant difference at the level of 0.05 between the grades of those who studied using brainstorming and the grades of students in the control group in the first exam they had. The last result come up with was that there were significant differences at the level of 0.05 between the mean of experimental group students' grades using brainstorming in the first and second exams they had and these differences were in favour of the experimental group in the exam they had after.

The Study Hypotheses:

The Main Hypothesis:

The use of problem solving strategy contributes to increasing academic achievement among 4th year middle school students according to the teachers' attitudes.

The Sub-Hypotheses:

-The students' ability to feel the problem contributes to increasing academic achievement.

-The students' ability to identify the problem contributes to increasing academic achievement.

-The students' ability to put hypotheses for the problem contributes to increasing academic achievement.

-The students' ability to gather information about the problem contributes to increasing academic achievement.

-The students' ability to arrive at a solution for the problem contributes to increasing academic achievement.

First: Survey

1. Survey Procedures:

The researcher visited Masaouden middle school, Jijel in order to select a sample from teachers.

2. Survey Aims:

-Identifying the study field.

-Making the main research tools (questionnaire).

-Determining the obstacles the researcher faces to avoid them in the main study.

-Identifying the type and size of the study.

3. Sampling:

The sample of the study was comprised of 10 randomly selected teachers from Messaoudan middle school to collect information the teachers' attitudes towards the role of problem solving strategy in increasing the students' academic achievement.

4. Questionnaire reliability:

The researcher used the statistical package of social sciences (SPSS22). Thus, reliability coefficient "alpha cronbakh" to identify the reliability of the questionnaire used. The results showed a high level of reliability (0.70).

5.1. Questionnaire Validity:

The questionnaire was presented to a group of arbitrators comprised of faculty members specialized in educational sciences. They gave their opinions concerning the research tool, edited it and write the final version of it which consists of 31 items distributed on five sections.

5.2. Internal Validity:

Self validity is defined as the square walls of reliability coefficient alpha cronbakh. In this study, the reliability coefficient is 0.07 and its square wall is 0.83 which shows a high degree of self validity.

Second: The Main Study

1. Settings of the Study:

-Timing: It refers to the duration which lasted from 23 rd of April till 30th of April 2022-07-28

-Place: It refers to the geographical area of the field study. This study was conducted in three middle schools in Jijel: Bal Abed Abdurrahman (Benyajis) middle school, Zermani Rabeh middle school (Kaouas), and the national interest middle school (Harratan).

2. Research Methodology:

An analytical descriptive research design was used. This approach is based on describing phenomena objectively through the data collected. This is the most appropriate design for the current study.

3. Study Sample:

Since the study in hands investigates the role of using problem solving strategy in increasing learners' academic achievement according to middle school teachers' attitudes, a random sample was selected and it was comprised of 68 middle school teachers.

4. Research Instruments and its Psychological Characteristics:

4.1. Research Instrument:

The researcher used a questionnaire to identify the role of using problem solving strategy in increasing the students' academic achievement according to middle school teachers' attitudes.

The Questionnaire Steps:

-Revising the previous studies and the theoretical part of the study which is related to problem solving strategy and academic achievement.

-Identifying the aim of the questionnaire which is the investigation of the problem solving strategy role in increasing middle school students' academic achievement.

-Identifying measurement sections for the research tools It consists of sections and paragraphs.

-Presenting the research instrument to 6 arbitrators in the education faculty so that they revise and edit it.

4.2. Using Likert Scale to Arbitrate the Questionnaire (always, sometimes, never):

Table01. *Triple Likert Scale*

Answer	always	Sometimes	never
Grade	3	2	1

The researcher calculated the mean, standard deviation and determining the sample members' attitudes. As it is showed from the following law,

3: the number of options in the scale 3-3/1

1: relative weight of the option

3: the synthetic value (always, sometimes, never)

1.33: relative weight for each synthetic value

Table02. *Corrective Degree for the Questionnaire*

Corrective degree	Descriptive value
From 1 to 1.66	weak
From 1.67 to 2.33	medium
From 2.34 to 3	high

3.4. The Questionnaire Reliability:

Alpha cronbakh coefficient was calculated to test the questionnaire reliability using SPSS22. It was applied on a sample of 68 teachers and its value was 0.65 which is considered as medium and it reflects the questionnaire reliability.

4.4. The Questionnaire Validity:

4.4.1. External Validity:

The researcher presented the questionnaire at its first version to arbitrators of the educational faculty at university specialized in educational sciences, psychology and speech therapy so that they revise and edit it. The researcher did all the necessary modifications and accepted the pieces of advice given to her to make the final version of it.

4.4.2. Internal Validity:

It is defined as the sqrt of the reliability coefficient. Thus, the cronbakh coefficient obtained was 0.65 and by sqrting it, it was got $\sqrt{0.65}$=0.80. This value shows a high internal validity.

5.5. The Statistical Indexes:

The researcher utilized the mean, standard deviation, and cronbakh coefficient.

First: Data Presentation:

1. Presentation of the First Hypothesis Results:

The students' ability to feel the problem contributes to increasing their academic achievement. To test this hypothesis, the researcher calculated the mean and standard deviation as it is shown in the following table.

Table03. *Mean and Standard Deviation of the Teachers' attitudes towards feeling the problem*

Item	Item	Statement	Mean	Standard	Degree

Number	Grade			Deviation	
4	1	When I increase the students' self confidence to solve the problem, this increases their academic achievement.	2.81	0.39	high
2	2	When I contribute to increasing the students' feeling of the problem, this helps them to remember it in the future.	2.65	0.54	high
3	3	When I push students to solve the problem, it increases their understanding for the lesson.	2.57	0.49	high
6	4	I draw their attention to the importance of solving the problem which increases their academic achievement.	2.56	0.50	high
7	5	I raise their morals to feel the problem to help them increase their academic achievement.	2.35	0.53	high
1	6	I make them feel the problem and think deeply about its nature.	2.46	0.53	high
5	7	I contribute to making them feel the problem through discussing it to help them increase their academic achievement.	2.35	0.56	medium
The Global Grade			2.56	0.50	high

Source: based on the results obtained from SPSS22

The table above shows the means and standard deviation values and the degree of the teachers' attitudes towards the students' feeling of the problem. It was found that the majority of teachers claimed that when students feel self confident, their academic achievement increases (with a mean of 2.81 and a standard deviation of 0.39). For the teachers' responses concerning their contribution to helping learners feel the problem, they were of a high degree with a mean of 2.56 and a standard deviation of 0.54 because of the teachers' awareness of the capital importance that feeling the problem has. In addition, their attitudes towards pushing learners to solve the problem were of a high degree as well with a mean of 2.57 and a standard deviation of 0.49 which is a close to their responses about drawing students' attention to problem solving importance, about raising learners' morals, and about improving the students' cognitive skills (thinking) with means of 2.56 and 2.53 and a standard deviation of 0.50 and 0.53 respectively which is considered as high. Meanwhile, the teachers' responses about the statement 'making students' feel the problem makes them think deeply of the problem' were of a high degree as well with a mean of 2.460 and a standard deviation of 0.53. Whereas, the hardest responses were those of making students feel the problem through discussions with a mean of 2.53 and a standard deviation of 0.56 which is considered as medium.

2. Presentation of the Second Hypothesis Results:

It says that students' ability to identify the problem contributes to increasing their academic achievement. To test this hypothesis, the researcher calculated the mean and standard deviation as it is shown in the following table,

Table04. *Mean and Standard Deviation of the Teachers' Attitudes towards the Identification of the Problem*

Item Number	Item Grade	Statement	Mean	Standard Deviation	Degree
12	1	I plan to determine the problem so that I help students to increase their academic achievement.	2.62	0.49	high
11	2	I contribute to train students to determine the problem goal to enrich their knowledge.	2.59	0.55	high
8	3	I choose a task that suits the students' level to increase their academic achievement.	2.54	0.55	high
13	4	I identify the obstacles students face while determining the problem to improve their skills.	2.53	0.55	high
14	5	I contribute to train students to prescribe the current situation of the problem to help them improve their skills.	2.32	0.33	medium
9	6	I give explanations to help them identify the problem and improve their academic achievement.	2.29	0.52	medium
10	7	I choose a problem which hasn't been dealt with before to increase their academic achievement.	2.21	0.65	medium
Total			2.44	0.51	high

Source: based on the results obtained from SPSS22

The table above sows the means and standard deviations and the degree of teachers' attitudes towards the identification of the problem. It is clearly shown that the majority of teachers claimed that they plan to identify the problem to help learners increase their academic achievement with a high degree (mean of 2.62 and standard deviation of 0.49). Besides, the teachers' attitudes towards their contribution in training students to identify the problem were high as well with a mean of 2.59 and a standard deviation of 0.49 which is close to their responses about choosing a suitable task for the students' levels and to their responses about identifying the obstacles students face while determining the problem with means of 2.54 and 2.53 and standard deviations of 0.55 and 0.55 respectively. Meanwhile, the teachers' attitudes towards their contribution to training learners to prescribe the current situation of the problem was of a medium degree with a

mean of 2.32 and a standard deviation of 0.33 which is close to their responses about giving explanations to help students determine the problem with a mean of 2.21 and a standard deviation of 0.52. The hardest response for teachers was that of choosing a task which hasn't dealt with before with a mean of 2.21 and a standard deviation of 0.65.

3. Presentation of the Third Hypothesis Results:

-The students' ability to put a hypothesis contributes to increasing their academic achievement. To test this hypothesis, the researcher calculated the mean and standard deviation as presented in the table bellow,

Table05. *Means and Standard Deviations of the Teachers' attitudes towards Putting Hypothesis*

Item Number	Item Grade	Statement	Mean	Standard Deviation	Degree
15	1	I contribute to train learners to put temporary solutions for the problem to increase their academic achievement.	2.50	0.58	high
20	2	I contribute to train students to test the hypothesis correctness which increases their academic achievement.	2.44	0.63	high
16	3	When students put hypothesis based on their previous experiences, this contributes to increasing their academic achievement.	2.35	0.61	high
18	4	I ask students to put hypotheses based on discussions made which helps them improve their knowledge.	2.24	0.73	medium
17	5	When students choose the appropriate hypotheses for the problem, their academic achievement increases.	2.19	0.67	medium
19	6	I ask students to follow some hypotheses based on experiment to help them increase their academic achievement.	2.19	0.65	medium
Total			2.31	0.64	medium

Source: based on results obtained from SPSS22

Table06 includes the means and standard deviations and degrees of teachers' attitudes towards putting hypotheses. It was found that the majority of teachers claimed that they contribute to training students to put temporary solutions for the task so that they increase their academic achievement with a mean of 2.50 and a standard deviation of 0.58. Meanwhile, their responses about their contribution to train students to test the hypotheses correctness so that they increase their academic achievement with a medium degree (a

mean of 2.44 and a standard deviation of 0.63). Additionally, the teachers' responses about putting hypotheses based on previous experiences were of a medium degree (a mean of 2.24 and a standard deviation of 0.73). The weakest response for teachers was that students choose the appropriate hypotheses for the problem to increase their academic achievement with medium degree (mean of 2.19 and standard deviation of 0.67) and it is equal to that response about asking students to follow hypotheses based on experimenting to help them increase their academic achievement with a medium academic achievement (mean of 2.19 and standard deviation of 0.46).

4. Presentation of the Fourth Hypothesis Results:

-Students' ability to collect data contributes to increasing academic achievement. To test this hypothesis, the researcher calculated mean and standard deviation. Data is presented in the table below,

Table07. *Means and Standard Deviations for the Teachers' Attitudes towards Collecting Data*

Item Number	Item Grade	Statement	Mean	Standard Deviation	Degree
25	1	I guide students to collect data from valid resources to help them enrich their knowledge background.	2.59	0.57	high
24	2	I contribute to guide students collecting data through observation to help them increase their academic achievement.	2.47	0.53	high
21	3	I divide students into groups to collect data to help them exchange as much information as possible.	2.46	0.53	high
22	4	I guide students to collect data from books to help them increase their academic achievement.	2.37	0.62	high
26	5	I guide students to classify data to help them increase their learning performance.	2.34	0.63	high
23	6	I guide students to use the internet to collect data to help them collect as much data as possible.	2.07	0.63	medium
Total			2.38	0.58	high

Source: based on results obtained from SPSS22

The table above presents the means and standard deviations and the degree of the teachers' attitudes towards collecting data. It was arrived at that the majority of teachers stated that they guide their students to collect data from valid resources to help them

enrich their background knowledge with a high degree (mean of 2.59 and standard deviation of 0.57). In addition, their response to guiding learners to collect data through observation was high with a mean of 2.47 and standard deviation of 0.53 which is close to their response to dividing students into groups to collect data with a high degree (mean of 2.46 and standard deviation of 0.53). Besides, their attitudes towards guiding students to collect data from books with a high degree (mean of 2.37 and standard deviation of 0.62). The same for their response about classifying the data which was high as well with a mean of 2.34 and a standard deviation of 0.63. Meanwhile, the weakest teachers' attitudes about guiding their students to use the net to gather information were medium with a mean of 2.07 and a standard deviation of 0.58.

5. Presentation of the Fifth Hypothesis Results:

Students' ability to arrive at a solution for the problem contributes to increasing their academic achievement. To test this hypothesis, the researcher calculated the mean and standard deviation as presented in the following table,

Table08. *Means and Standard Deviations for Teachers' attitudes towards arriving at the Problems Solutions*

Item Number	Item Grade	Statement	Mean	Standard Deviation	Degree
27	1	I help students while solving the problem to enrich their knowledge.	2.88	0.54	high
31	2	I mention the mistakes made by students while solving the problem to help them improve their capacities.	2.74	0.50	high
28	3	I contribute to making the final results of the problem to show the students' academic achievement.	2.62	0.51	high
29	4	I contribute to training students to present the proofs which support the results they arrived at to show their academic achievement.	2.49	0.58	high
30	5	I give students rewards when they arrive at the solution to encourage them.	2.49	0.50	high
Total			2.64	0.52	high

Source: based on the results obtained from SPSS22

Table08 shows the means and standard deviations and the degree of the teachers' attitudes towards arriving at a solution for the problem. It is shown that the majority of the teachers help students while solving the problem to enrich their background knowledge with a high degree (mean of 2.88 and standard deviation of 0.54. Besides, their responses to that at the end they mention mistakes made while solving the problem were with a high degree (mean of 2.74 and standard deviation of 0.50). The same for their attitudes towards their contribution to make the final results of the problem and to train students to present the proofs which support the results they arrived at were high as well with means of 2.62 and

2.49 and standard deviations of 0.51 and 0.50 respectively. For their response about giving students rewards when they solve the problem was high with mean of 2.49 and standard deviation of 0.52.

Second: Results Discussion and Analysis

1. Discussion and Analysis of the First Hypothesis:

From the first hypothesis results, that students' ability to feel the problem contributes to increasing their academic achievement according to teachers' attitudes, it came second with a mean of 2.56 and standard deviation of 0.50 which is considered as a high rate.

The researcher came up with that the students' feeling of the problem encourages them to solve the task. This latter is considered of the most important steps followed by students to solve the problem. That is to say, if the student does not feel the problem, he/she will not think or make any efforts to solve it. Therefore, feeling the problem is of capital importance in problem solving strategy and the successful teacher is the one who draws the students' attention to that there is a problem through discussion, pushing them to try solving it, raising their morals, or making them think deeply of its solution and its nature. These results are the same as those of the studies conducted by Al Khatib (2011) and that of Glasgow Nil (1997).

Based on what was found, the first hypothesis come true because of the positive role of feeling the problem in increasing students' academic achievement.

2. Discussion and Analysis of the Second Hypothesis Results:

From the results obtained about the second hypothesis which says that students' ability to identify the problem contributes to increasing their academic achievement. This hypothesis came third with a mean of 0.44 and a standard deviation of 0.51 which is a high degree. Thus, identifying the problem encourages students to study the problem and try to solve it. Students need to determine the problem and try to find solution for it together with the help of the teacher which is an important step so that it does not get subdivided and interrelated with other problems. Those results support what was come up with in Ibrahim (2000), Mohriya (2016) and Mahmud Suzan studies.

Based on the foregoing, the second hypothesis come true because of the capital importance of the identification of the problem in increasing students' academic achievement.

3. Discussion and Analysis of the Third Hypothesis:

Based on the results obtained about the third hypothesis which says that students' ability to put hypotheses contributes to increasing their academic achievement, it came fifth with a mean of 2.31 which is medium.

The researcher explains these results considering that the hypotheses put by students are thoughts put under the teachers' observation to solve the problem based on observation, experiment, and examination of resources. Thus, putting hypotheses is essential in problem solving strategy. These results support what information processing theory and behavioural theory.

Consequently, the third hypothesis, come true because of the essential role of putting hypotheses in increasing middle school students' academic achievement.

4. Discussion and Analysis of the Fourth Hypothesis:

Based on the fourth hypothesis which says that students' ability to collect data contributes to increasing their academic achievement. It was come up with that data collection came fourth with a mean of 2.38 and standard deviation of 0.64 which is considered as high.

The researcher come up with that data collection is important in the teaching process and students put hypotheses and test them with the help of the teacher through dividing themselves into groups. Each group collects data about the hypothesis and from resources, books, internet or observation.

As a result, the fourth hypothesis comes true because of the important role of data collection in increasing students' academic achievement. These results support the results obtained in Jackson (2000) and Mona E-Nakhala (2004) studies.

5. Discussion and Analysis of the Fifth Hypothesis:

Based on the analysis of the fifth hypothesis results which says that students' ability to solve the task contributes to increasing their academic achievement, it came first with a mean of 2.64 and a standard deviation of 0.52 which is a high rate. Thus, it's important to have the ability to solve the problem in problem solving strategy and the teacher needs to mention the students' mistakes made during solving the problem, help them to do so and make the final results. It supports the cognitive direction behavioural theory, problem solving explanatory theory and studies conducted by Al-Khatib (2011) and Mohriya (2016).

As a result, the fifth hypothesis came true because of the essential role of arriving at the solution for the problem in increasing students' academic achievement.

Based on the study results, it was found that problem solving strategy contributes to a high extent in increasing middle school students' academic achievement according to the teachers' attitudes because it helps them rely on themselves solving problems.

-Middle school students' ability to feel the problem contributes to increasing their academic achievement.

-Middle school students' ability to identify the problem contributes to increasing their academic achievement.

-Middle school students' ability to put hypotheses contributes to increasing their academic achievement.

-Middle school students' ability to collect data contributes to increasing their academic achievement.

-Middle school students' ability to arrive at a solution for the problem contributes to increasing their academic achievement.

Fourth: Suggestions

-The authorities responsible for education need to encourage the use of modern methods and strategies of teaching like problem solving strategy, the six thinking hats strategy and brainstorming and other strategies which improve critical and creative thinking. These strategies help students to be more creative and improve their skills with variety of strategies seeking quality of teaching and a motivating environment involves all the necessary potentials for applying these strategies.

-Teachers must receive trainings about the innovative teaching strategies like problem solving strategy.

-The authorities responsible for education need to hold seminars to emphasize the role of this strategy in increasing students' academic achievement and improving their cognitive skills.

All in all, problem solving strategy is one of the most effective strategies to improve students' skills and academic achievement precisely and this is what was come up with in this study approximately in all the specialties. Besides, it improves critical and creative thinking and this is the goal of modern education and technological development which requires huge creative and thoughtful brains. This latter obliges education to moderate its strategies and programmes.

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