

# Teaching Methods for Developments of Mathematic Thinking of Math, and Methods of Teaching Mathematics College Students

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**Abstract** An open questionnaire was distributed to a sample of (30) of university professors' from various scientific and social sciences colleges, the question was: what are the method of teaching that you are using? The response to the questionnaire was, the lecture type is the method OF teaching for the following reasons: large number of students enrolled in each section (88%). The subject nature (85%). Going by syllabus and limited time (80%). Lack of motivations to use an alternative method. (90%) Grading system (89%) The traditional vocabulary existence (70%). Lack of students' desire of to participate, or negative attitude of the students of the educational process (92%). Discussing these issues with seniors mathematics majoring students in College of Education ( method of teaching math) after their return from field training who faced some difficulties in the educational situation which need to think or express an opinion on a particular subject, as well as the general education students find it difficult when they are solving mathematical problems, who are not able to infer the answer of the question from the given data. The researcher tested a group of(40) students of Mathematics Department students' and, method of teaching mathematics students in college of education, intended to find out inferential thinking growth rate, the overall average math major (52.40) and (48.51) for method of teaching math. Note that the test was taken in pre-calculus, calculus1, and calculus 2 level, there were no statistically significant differences at the level of significance (0.05),between all levels and fields, this means that there is no growth in mathematical thinking during different levels nor in major, mathematical thinking needs to exercising and training, thinking skills which needs prior training or guidance to these skills through certain methods of teaching, since students vary in their abilities, and some of them even cannot think logically.

**Keywords:** *mathematic thinking*

**Cite This Article:** Salwa Mrayyan, "Teaching Methods for Developments of Mathematic Thinking of Math, and Methods of Teaching Mathematics College Students." *American Journal of Educational Research*, vol. 4, no. 2 (2016): 147-149. doi: 10.12691/education-4-2-1.

## 1. Introduction

The lecture is dominant type of teaching, lack of education outputs is logical and it will not reach to the desired level, in general students inability to express a certain situation and ask questions in the classroom, unwillingness to join brainstorming discussion.

Discussion of the topic with senior students in methods of teaching mathematics after their return from the field

training, who faced some difficulties in mathematical thinking at some situation which need thinking or express an opinion, as well as the general education, students found it difficult in thinking when solving mathematical problems and are not able to inferred from question's data. The researcher tested a group of (40) students in math major, and methods of teaching mathematics, the researcher was intended to find out the growth in inferential thinking they have the result summarized in [Table 1](#).

**Table 1. Inferential thinking growth**

Math Students				Method of Teaching Math			
Year	Number of students	Mean	Standard deviation	Year	Number of students	Mean	Standard deviation
First	5	50.10	18.28	First	5	45.92	12.8
Second	5	51.15	17.91	Second	5	46.81	13.3
Third	5	53.55	18.26	Third	5	50.23	12,9
Fourth	5	54.90	32.91	Fourth	5	51.08	11.6
Over all Average		52.425				48.51	

Table shows that all students' mathematical thinking level in overall average for all respondents in math section

is (52.425%) and math teaching method section is (48.51) the test was in pre-calculus, calculus1, and calculus 2,

which shows that there is no statistically significant at the level of significance (0.05) in all years, this means that there is no difference in thinking growth of the student in all years. Suggested several methods of teaching that can be employed by the teacher to enhance the students' thinking development, and the student will be the focus of the educational process instead of the negative attitude in which the student is the recipient only.

## 2. Research importance

Improve higher education depends on the ability of the faculty members to do the expected roles in the inputs and the outputs processes through the optimal investment of material and human services available, and stand to achieve their goals in evaluating aspects of all institutions, especially since any timetable process must be based on specific criteria for assessment to determine the appropriate methods, procedures, efficiency, effectiveness, and the degree of objectives achievement [2].

The consequences of the new tasks and the responsibility of higher education institutions that deal with education as a process not bounded by time or place and continue with the human as urgency and needs, to facilitate the adaptation of the environment developments of the faculty members at universities.

Professional development as academically investment helps to improve university professor performance and thus improve the skills, which would increase the efficiency of the educational system to improve learning outcomes. Therefore, higher education institutions need to train its employers to technology integration in teaching as well as to stimulate the teaching by using technology in teaching provided and training them on the procedural steps to deal with all members.

It is important to the university, colleges of education to hold workshops for teachers at the university who do not have the preparation of educational methods appropriately, and this is done through a suitable method of teaching and to help those who may have psychological barriers such workshops because they see themselves appropriately and academically qualified, and there is no need for such workshops. University professor who are trying to provide educational texts books in a clear manner, examples, graphics, multiple discussions, according to the educational textbook needs to be taught that enhance thinking it +requires a teacher of creative thinking enhancement abilities, which become one of the educational curriculum requirements that attaches great importance to think and put it as one of the objectives which must be enhanced by the processes of teaching and learning, and many of its activities that aims to train students to think, developed educational programs, people become less dependent on the facts, basic skills, more dependent on the ability to process information.

Among the techniques and strategies for the development of thinking process, (brainstorming strategy), which is one of the most commonly used methodologies for the development of creative thinking. Thinking does not happen unless there is a problem felt by the individual, the need to provide a solution, completion of shortage or remove inconsistency and contradiction eventually leading to the closure of what is deficient in attitude and solve or

settle the problem, and address them successfully is not only during the mental processes used by individuals to obtain the necessary information related to those problems and make it a meaningful, in addition for how to address them and use them properly, that the learners' use patterns of good thinking leads to a deeper understanding of topics, which leads to some more meaningful link of these topics together which helps on active learning, and this means that the teacher duty is to help students to think properly. It was observed that when a question asked make teaching atmosphere topped with fun and joy as well as enhancing and improve thinking, considering brainstorming as teaching style on at the university, will helps teachersto enhance and improve mathematical thinking.

**Brainstorming**, it is based on the perception to solve the problem by the two parties challenging each other, part of the problem and the solution that requires the human mind. In order for the mind of getting around the problem and looking at it from more than one side, trying to know and storming in every way possible. and ideas actively that are generated the speed of the storm resemble. There are four basic rules for brainstorming

- **Delayed criticism:** This means that the anti-rule of the ideas should be postponed until later, not plagued by the ideas of others and let them express it and feel the freedom to express their feelings and ideas without evaluation.

- **Welcoming free response:** The more comprehensive, and broader ideas this is the best.

- **Quantity needed:** the greater the number of ideas ups the balance of useful ideas.

- **Composing and development:** contribution and addition to their own ideas guessing the ways in which they can transform their ideas of others to more quality or how to integrate the two ideas in one or more to better idea of the ideas [1].

## 3. Study Purpose

Give an idea about some methods that would improve the of university teaching quality and contribute to motivating innovation for both students and professors.

## 4. Methodology

To implement the objective of this research some suggested methods that would improve the quality of university teaching and contribute to motivating innovation in the university community, after reviewing literature regarding the best teaching methods found that most of them focused on brainstorming method to solve problems through which all teachers and according to his specialty to put forward the idea for discussion and receive provided answers, takes into account of the following:

- **Criticism question:** do not criticize the idea no matter how trivial or impossible.

- **Free question:** the idea was reckless, the better.

- **Essential quality:** the increasing number of ideas means an increase in the number of winners.

- **Merging and improving:** the possibility of merging ideas with each other, or to improve some of them.

- **Daily discussion of some of the questions and puzzles**
- **Deduce generalization and rules:**. As an example: When students are asked to find two numbers their sum equal their products easily reached by many of the students:

$$0 \times 0 = 0, 0 + 0 = 0, 2 + 2 = 4, 2 \times 2 = 4$$

What is the total of these numbers?, and finding the generalization for the nth sum.

And the example of finding two numbers if you change their decimal their product is still the same:

$$12 \times 24 = 12 \times 42 = 504$$

$$21 \times 63 = 12 \times 36 = 756$$

$$21 \times 48 = 12 \times 84 = 1008$$

$$31 \times 26 = 13 \times 62 = 806$$

$$31 \times 39 = 13 \times 93 = 1209$$

- **Third: the discovery of fallacies:** For example, to prove that every number is equal to the additive invers

$$(3 = -3): \text{We know } 9 = 9,$$

$$\text{so } 9 - 9 = 0 \text{ which equal to}$$

$$(3 - 3)(3 + 3) = 0,$$

$$\text{dividing both sides by } (3 - 3) \text{ Get}$$

$$3 + 3 = \text{implies to } 3 = -3$$

Asking the students will you accept the proof if not Where is the error (or fallacy)?

For the example, can you prove that  $3 = 1$ ?

A student suggests this proof, suppose that,

$$x = y. \quad (1)$$

By multiplying both sides the equation by 3 we get

$$3x = 3y. \quad (2)$$

Now  $3x - 3y = 0$  but  $(x - y) = 3(x - y)$  divide by  $x - y$  we get  $1 = 3$ .

Asking the students Do you accept this result and if not what went wrong with that?

## 5. Brainstorming Strategies

1. Identify and discuss the problem (the subject of the meeting), given enough time.

2. Reformulation of the problem.
3. Create an atmosphere of creativity and brainstorming.
4. Introduce your ideas regardless of fault or the senses or strangeness.
  - Do not criticize other people's ideas or object.
  - Do not dwell in the speech and tried to shortcut what you can.
  - You can take advantage of other people's ideas that conclude them or their evolution.
  - Listen to the instructions of Chairman and implemented.
  - Given the opportunity to the meeting a decision to write down your thoughts.
  - Appoint a rapporteur for the session to write down ideas.
5. Participants are asked to begin their ideas to answer questions.
6. The decision of the meeting left sequential ideas on the blackboard in front of the participants. And identifying that this method greatly helps to call the students' information and posed ideas what was for the teacher to expect, The teacher believes that there are good capabilities of the students, because the creative thinking way is a basic technique for generating new solutions in unusual ways in which imagination is used widely.

Creative thinking is the opposite of logical thinking: -

- Creative talent is owned by all the people to varying degrees.
  - Learning can generate new ideas and unprecedented.
  - Creative thinking can be a rational way to generate an appropriate scientific ideas.
  - The directors encourage others to generate new ideas, and are not a requirement that they be creative.
  - Creativity is not the preserve of the smart people, but all people can be creative whenever they had the opportunity (the record of art source of decision-making).

## References

- [1] Kubaisi, Abdul Wahid Hamid, 2008, the methods of teaching mathematics, the Arab community library, Amman, Jordan.
- [2] Canaan, Ahmed Ali, (2005), the accreditation of higher education institutions in the Syrian Arab Republic between reality and expectations, Faculty of Education at the University of Damascus.