

OVERVIEW ON TEACHING METHODS OF MATHEMATICS

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ABSTRACT

In this literature, various teaching method are investigating from theoretical perspective and it is written generally. Separation of methods from each other are for theoretical study, because only teacher can apply a certain method or several method in providing mathematics contents, simultaneously.

It is evident that this method are take place on the basis of cognition of students. It is note that we cannot describe a certain teaching method of a lesson for teacher. In other words, it is state that there are teaching method as the number of word teacher which we deals with model and general methods of teaching in this chapter which can help the teacher to express the content and methods, and it is problem solving for start and doing teaching.

Keywords: Methods,Mathematics,Active,Verbal,Participated,Allegoric,IndicativInferentiale.

1. INTRODUCTION

Mathematics is a beautiful God's gift which had been given to thoughtful human. It make life regular and give life to spirit, prepare human mind for recognizing good and give logical order to scattered truths. Proportionality, symmetry, and order equilibrium which are esthetic pillar are ingredient of mathematic issues. Mathematics is intelligence formulating. Mathematics is an art with inner adjustment and regularity and it is exact language to

establish scientific communications, and also it is necessary and useful tool for human of 21th century. Today, an of science including medicine and literature intend to legislated their scientific work as mathematics or state them like mathematics. By mathematics we can thoughtful in official work with responsibility, life management, restrictions and dilemmas. So, it is essential to pay attention to teaching and learning mathematics[6,14]

Researchers and psychologist distinguished various teaching methods for various lessons and name each of them. Various test in age step in separated educational places indicate that some of this methods are suitable and efficient for certain teaching of a material. It is certain that we cannot claim that even two experienced teacher teach same certain content or material, because the other factors such as personality. Experience, awareness degree, literacy and even social environment and teacher family nature are influence on their education manner. So they must pay attention to this factor and student reaction and growth environment and their kind of nature.[6&18.19]

So it is essential that teacher have relatively awareness for general teaching methods, and then they must take place in mixing the methods or providing the teaching methods which certainly, with enough or relatively information on this affairs have joyful class [1&9]. And if while teaching ask teacher that how they teach and for what method, they can cope with this question. So a teacher who do not know to start a lesson subject with a method, is as same as a football player who step toward goal without exact program[6]

With regard to this briefly literature, some kind of methods are explanation briefly. It is noteworthy that each of this method have some advantages and disadvantages which we avoid the mention of that.

A teacher for reaching to goals and success in teaching must adjusting and ready the lessons material to provide a background for teaching, then she/he must perform this material, so education and teaching are regulatory affairs from two point of view.[6,16]

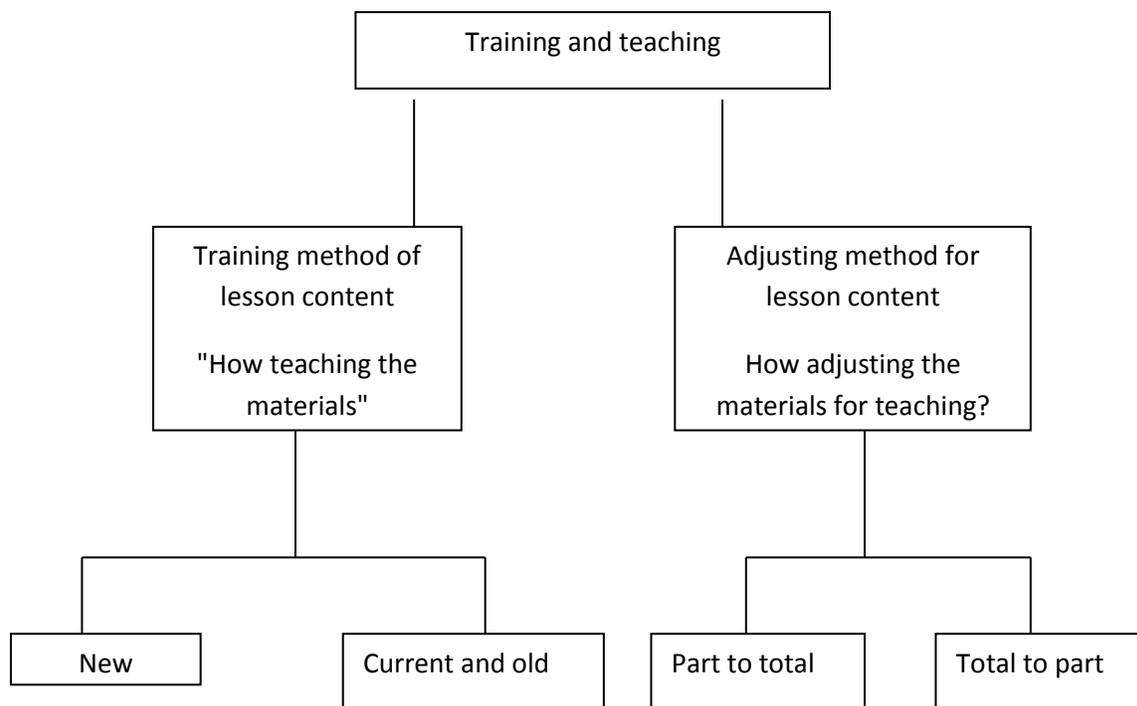
2. CLASSIFICATION OF EDUCATION AND TEACHING

2.1 Teaching method (training) of lessons contents (how teaching the adjusted materials?)

2.2 Adjusting lessons content method (how adjusting the materials for teaching?)[7]

Training method of lesson content is investigating in two perspective:

- a) current and old
- b) New



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A) Current & Old Method (tradition)

It is refer to the methods which had been used in the most world school over time of education and also today it is depended on schools and are:[3,6,11,16]

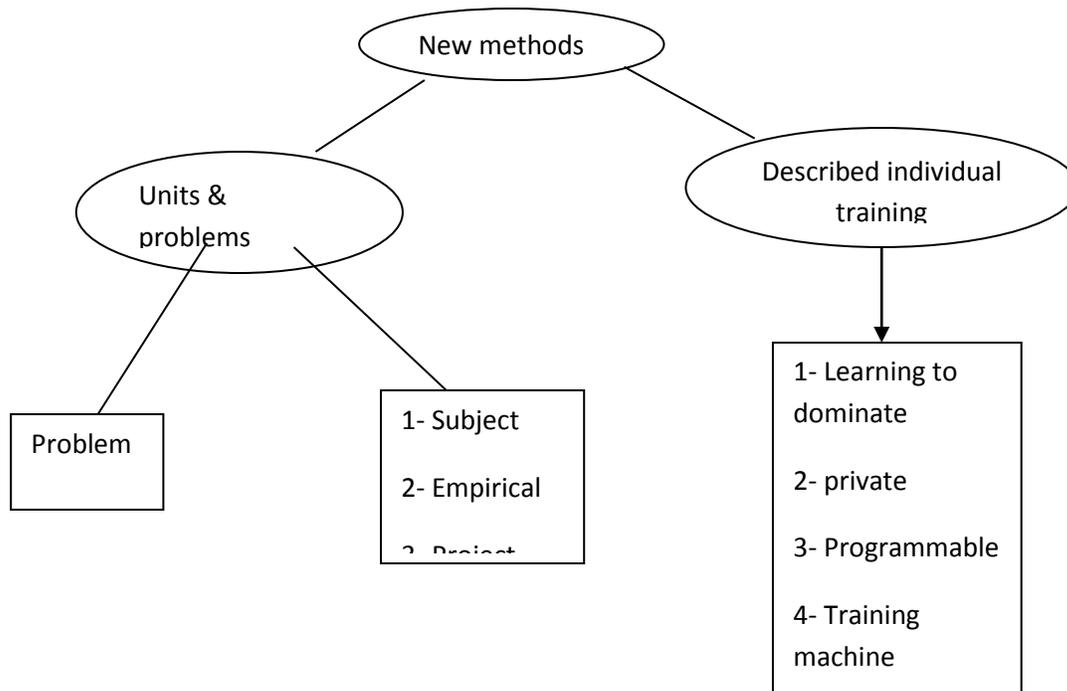
1- repeating
2- verbal
3- mechanical- reasoning
4- experimental
5- dramatic
6- role playing

B) New methods

7- scientific "real- model"
8- field trip
9- question & answer
10- group discussion
11- controversial
12- schooling
13- monitoring
14- modeling
15- comparison
16- simulation
17- using of experiences and visual observations.
18- consonant reading
19- seminar
20- using of example
21- mixing method

Parallel with current and normal methods of instructors, psychologist and experts and ..., also the other method are provided that which had been designed variously based on learner abilities. And most of them are

complement method of current and normal educational methods or they similar to them which are:[2,4,6,20]



3. MATHEMATICS TEACHING METHODS

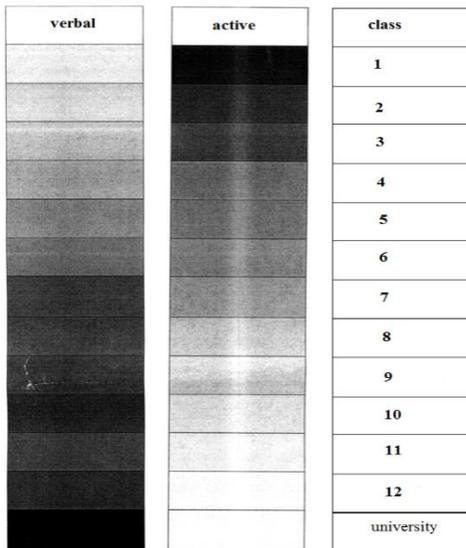
The methods which were discuss in the past section (current or new) some of them such as verbal[20], scientific[5,16,21], group discussion[2,6,10], modeling[2&6], comparing[6,9,16], simulation[2,6,9,10], experiences and visual observations[5,6,10,16], seminar[6], using of example[5,6,10], individual training[20] and units[20] have better efficiency in mathematics which can divide them in to 3

general method "verbal intuitive and active."[6]

3.1 Verbal Method

Verbal method is not suitable in early years of teaching or training but gradually tack better form with entering the student to higher grade and their growth mind. That is as we go a head from elementary period to guidance school and high school, verbal method role become more

important. And it is on their peak in higher period (figure 1). This method has advantages and disadvantages [5621].



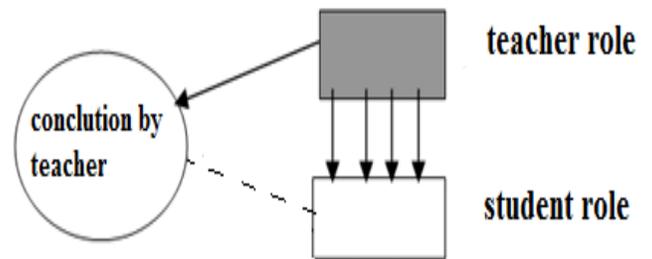
(figure 1)

This method in turn is two kind:

- a) Rule state
- b) reasoning

a) Rule state: some teachers said that at the early step of teaching, they must not focus on material comprehension, especially mathematics. If a child can identify the number and can perform the key action fast and correctly is sufficient because. First, deep understanding of concepts and mathematics relation are not cope with the children who initially enter the school and they must not lost the time because for remove necessary requirements, having calculating is sufficient. Second, applying mechanical method allow our to teach the material which are essential for all student, easily. And we must devoted saved time to

teaching more necessary materials [21]. Thirdly, repetition of mathematics operation lead interested children to understand the facts and relationship (figure 2) [6].



(figure 2)

. So in this method, teacher dictated the rule. And bring an example for each of them. Then by the help of various practices try to turn action executing to conditional reflex and become possible their quick and fast perform. [6] example [6.21]:

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} \lim_{x \rightarrow 0} \frac{tgx}{x} = 1$$

B) Reasoning method: in this method, teaching done with the help of reasoning and provide logic reasons which apparently it is the oldest method of teaching mathematics. This method, despite of exponents of mechanical method, is not deny the necessary of understand and relationship but it try to give understand the material to the students. So, they start their lesson with the mention of the principle and definition. Then they try transfer the big structure of mathematics to student based on this

principles and definition by inferential logic method and by the help of words and states. So, work of teacher is dictating the facts and relationship prove it and bring some examples and work of student first is kecking the principles and rules and then performing various practices which must gradually cause to clear their knowledge. And correct & fast executing of mathematics operation become possible for them. The reason of the exponents of this method is that mathematics is established on logic base. And its teaching goal is reinforcing reasoning force. So, initially this lesson must start as reasoning from until the child habit with logical idea gradually[21]examples[6.13]

Example(1)

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} = \lim_{x \rightarrow 0} \frac{\cos x}{1} = \lim_{x \rightarrow 0} \frac{\sin x}{x} \times \lim_{x \rightarrow 0} \frac{1}{\cos x} = 1 \times \frac{1}{1} = 1 \times 1 = 1$$

Example (2) $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c}$

$$\frac{3}{5} \div \frac{2}{7} = \frac{3}{5} \times \frac{7}{2}$$

$$\frac{3}{5} \times 1 = \frac{3}{5}$$

that

$$\frac{3}{5} \times \frac{7}{2} \times \frac{2}{7} = \frac{3}{5}$$

$$\frac{3}{5} \times \frac{\frac{7}{2} \times \frac{2}{7}}{\frac{7}{2}} = \frac{3}{5} \div \frac{7}{2}$$

that

$$\frac{3}{5} \div \frac{7}{2} = \frac{3}{5} \times \frac{2}{7}$$

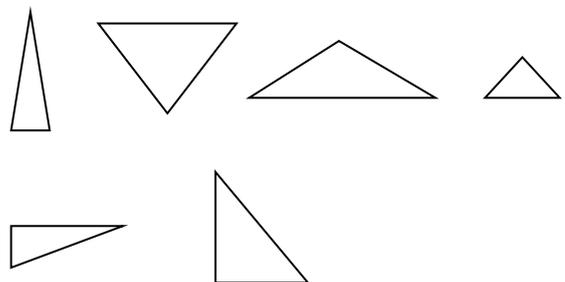
a) Allegoric reasoning: sometimes mind

Transfer an order about a thing to the other same thing. In this case, there is allegory or allegoric reasoning such as mars planet as earth have climate so we order that mars as earth have living things.examples[3.6.7.21]

(+∞ To the second (- ∞)In the desert Metaphorandallegory to express

b) Indicative reasoning: it is a reasoning where mind with rely to experience reach to a generalized theorem. And it is contrast with deduction. Inductive are two kind: total and deficient. Examples[6&7]

Examples (1) Measuring the angle sum of a triangle



Examples(2) Galileo discovered

SO:

The relationship between the length of the pendulum and swing time in 10 seconds

2,3,5,7 are Numbers prime But 2047 No Numbers prime. Because $2047 = 23 \times 89$

(S= Second) (t=length)

. that . Indicative is limitation[3,6.7]

t	1	2	3	4	5	6	7	8	9	10
L	1	4	9	16	25	36	49	64	81	100

c) Inferential reasoning method:

In allegoric and inductive reasoning we cannot talk with 100% confidence about the integrity of conclusion but in inferential reasoning we can it, certainly. In mathematics, a proposition which its correctness is prove by inferential reasoning called theorem.

So it follows that

$$t^2 = L$$

Attention: deduction, inductive and allegory are not teaching method but it is a kind of reasoning and thinking route for reaching to goal and taking the result and discovery of materials. Example)

Limitations of inductive reasoning

Theorem: [21]

(Addition rul for inequalities).If $a < b$, then

$$a + c < b + c \quad (1) \quad \text{foe every number } c.$$

proof: If $a < c$.or equivalently $b - a > 0$ then

$$(b + c) - (a + c) = (b - a) + (c - c) = b - a > 0,$$

Which is equivalent to (1) •[22]

P	$P^2 - 1$
1	$2^2 - 1 = 1$
2	$2^2 - 1 = 3$
3	$2^3 - 1 = 7$
5	$2^5 - 1 = 31$
7	$2^7 - 1 = 137$

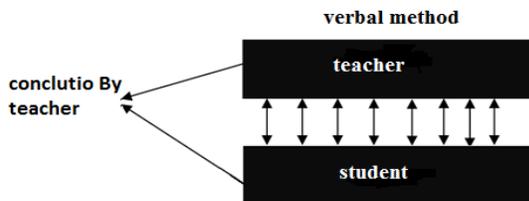
Deduction (or formal deduction)

Once mind reach from total theorems to partial results. For example, from total rule toward its action. Because formal deduction is Aristotle's initiative is called Aristotle's deduction.

3.2 Active Method

In this method, training set based on students activity. And student have active participation in learning. And they learn educational materials in their activities course (as imagined, sub imagined, abstract)

They face with problems, think about them and deals to solve it by guidance of teacher and understand meaning themselves and discover the mathematics rules, build the meaning in their mind and dominate on them (figure3). This method is based on learning psychological principles. The exponents of this method are Socrates, Jan Roso, John Dive, John Pige, Broner and Geory polia. This method in turn is 3 kind (heuristic method, participated learning, number and play

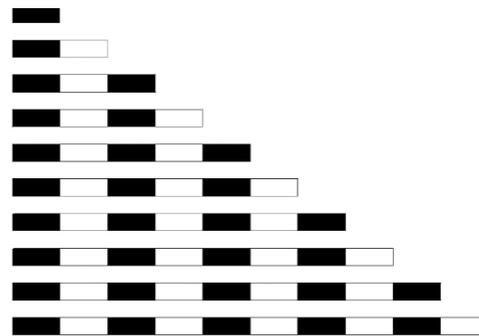


(figure3)

3.1 Heuristic Method

Heuristic method deals with teaching through heuristic and with using of pictures and forms and heuristic is direct understanding (figure4), transferring, discovery sudden comprehension.

Petalosi, soviet coach advice this method to teacher. This method is on the base of Gestalt school psychology and feeling geniuses school. The exponents of this method are: Washbern, Ly, Moris Bicon, Maria Montesserand kuhnel. This method is a kind of discovery method. [6.21]



(figure4)

3.2 Participated Learning

Definition: several definitions had been provided for participated learning which some so – called and comprehensive definition which also have the most shared aspect are follow:

Participated learning term are refer to a educational method where student in a small group work with each other for reaching to a same goal, and in addition to responsible for their learning, they responsible for the others learning. (Googal 1995)[9]

In general, student in participated learning become candidate when they work in a group for completing a geometrical puzzle, measuring play ground or study for test. In participated learning, students pay attention to meaning before working to each other. In participated learning, all of the students of a group are responsible to improving the comprehension and what any one must doing.

Group as a social unit create a commitment for all members, such as mountaineers, when the individual reach to the climax to

become one of the members of participated team, in other words, participated learning requires active and direct participate of the students

The studies and various investigations indicate that learning as participating can effective for training skillful mathematics. (Madin and Salvin, 1983, Salvin, 1984, Salvin & Carovit, 1981, Salvin and Madin, 1984, Salvin Madin and Livi, 1984). Of course several other study (Madin & Salvin, 1983, Salvin, 1984, Salvin and Krovit, 1981) indicated the constancy of learning scheduals that the students with success among the participated program compare to the students with higher success of their classmate enjoy more accepted in the society[5.19.20]

3.3 Mathematics activities by number and play

Provide activities which performed in order to complete and reinforcement training activities in mathematics class and fostering students abilities in this context include active involvement with number concepts as four key action in mathematics, that is, sum, subtract, multiply, divide

Boding activities are useful in learning mathematics operation and concepts (from the results of Owen, 1976, Rac, 1970, Humphrey, 1972)

Mobility required to suitable space.

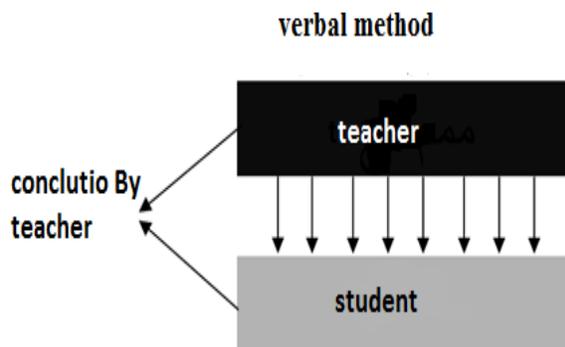
Quantities can show to learner as illustrative, for example, when he jumped to

a determined distance, that is, it can measured a specified distance with a determined unit exactly.[3]

In many case, full change of elementary mathematics program to active educational play is more successful than change of training reading program to this kind of play (Ginsburg, 1977). There are abstract concepts in language learning which almost is inhibiting the educational method using mobility. However, mathematics operation can simply change to the various play and we can teaching it.[5.18.19]

At the same time, provided activities are to complete teaching mathematic rather than alternating traditional mathematic classes. The most important play are:

Counting hanging ball- counting the mine umbrella and my friends, children in a collection, they can come and go, what is the shape of number and what I name that- look and sort- hear and jump- drawing – touching and jump- run in to it – running in sand spaceship- reinforcing counting – jump and count – run and jump- look rapidly and jump – how many you can- how many you can jump- find the sign – take up and count – take up the square- jump on answer and plan a problem and...(figure5)



(figure5)

CONCLUSION

Mathematics as a systematic intellectual course can help to put in logic many judgment and planning and also it will be applied as an effective tool for planning improvement program of the country so we must apply national abilities in order to reach to required industry and technology

And reported that the student in tradition educational programs enjoy less self-confidence for more success. we end up participated learning issue with the explain of the guidance for forming participated group. In the case of mathematics, students confront many quantitative and conceptual relationships, algorithms, and opportunities to apply mathematical knowledge to solve problems. Thus, training for generalization and strategic problem solving can become a ubiquitous part of mathematics curricula. By learning to be active and successful participants in their. Achievement, students learn to perceive themselves as competent

problem solvers. They are more apt to attempt to apply knowledge in novel ways and to persevere to solve difficult problems than if they see themselves as ineffective, likely to fail, and dependent on others to solve novel and difficult problems.

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