

The effect of using McCarthy model (4MAT) in teaching mathematics to develop prep stage students' conceptual understanding and analytical thinking skills

Abstract:

The study aims at discovering the effect of using McCarthy model (4MAT) in teaching mathematics to develop first year prep stage students' analytical thinking skills and conceptual understanding in Fayoum Governorate. The study sample included 84 students, split into two equal halves; one for the experimental group and the other for the control one. The researcher redesigned the "Numbers and Algebra Unit" introduced to the study sample in light of McCarthy model characteristics and principles. The researcher also designed two tools, namely, Mathematical analytical thinking measure and Mathematical conceptual understanding test. The study tools were proven valid and reliable then the designed unit was administered to the experimental group. The study concluded that:

- **The experimental group students outdid the performance of the control group in both measuring tools as there were statistically significant differences in favor of their results in the post implementation of the tools.**
- **There is a strong direct correlation between the mathematical analytical thinking skills and conceptual understanding.**

In light of the results and conclusions, the researcher recommends the following:

1. preparing a number of training sessions and workshops for prep stage teachers to train them on the use of the 4MAT model and designing educational program that consider the learners' individual differences and learning styles in all mathematics branches.
2. The importance of drawing the attention of mathematics courses planners and designers to use the 4MAT model and its teaching strategies especially for the prep stage.
3. Providing for a democratic free teaching environment similar to that suggested by the 4MAT model to make mathematics studying more enjoyable and interesting to provide for better learning.
4. Including a number of the 4MAT model educational activities and putting it forward in a way that permits the development of the variant thinking skills and conceptual understanding.
5. Using teaching strategies that allows students to work cooperatively and socialize allowing them to make use of their diversity and share ideas and opinions.
6. Encouraging mathematics teachers to include all students with variant learning styles in a way similar to that suggested by the 4MAT model and its strategies.

Keywords: McCarthy Model -Analytical thinking Skills – Conceptual understanding – Skills.