

1- Research problem :

The present study has tried to answer the following questions :

- 1- Do the strategies for chemical concepts' acquisition among the students differ according to the mental capacity?
- 2- Do the strategies for chemical concepts' acquisition among the students differ according to the cognitive style?
- 3- Do the strategies for chemical concepts' acquisition among the students differ according to the organization of content structure?
- 4- Does the level of chemical concepts' acquisition among the students differ according to the interaction amongst the mental capacity, the cognitive style and the organization of content structure?

II- Research limitations :

- 1- Selecting Ausubel's and Janet's models as suitable educational models for teaching concepts.
- 2- Mental capacity test by Pascaloni.
- 3- Test of simplification against cognitive complication by Payri.
- 4- Two units of electrical power out of chemical interaction and solar power in the chemistry course of first year, secondary stage and their reconstruction in the light of the selected models.
- 5- A group of first year, secondary stage students, Kalubia governorate.

- 6- A test in the chemical concepts included in the two units to discover the strategies used in concept's acquisition and the acquisition level.

III- Research hypothesis :

- 1- The strategies for chemical concepts' acquisition differ according to the mental capacity.
- 2- The strategies for chemical concepts' acquisition differ according to the cognitive style.
- 3- The strategies for chemical concepts' acquisition differ according to the organization of the content structure.
- 4- The students'level in chemical concepts'acquisition differ according to the kinds of manipulation.
- 5- The students'level in chemical concepts'acquisition differ according to the mental capacity.
- 6- The students'level in chemical concepts'acquisition differ according to the cognitive style.
- 7- The students'level in chemical concepts'acquisition differ according to the interaction between the kinds of manipulation and the mental capacity.
- 8- The students'level in chemical concepts acquisition differ according to the interaction between the mental capacity and the cognitive style.
- 9- The students'level in chemical concepts'acquisition differ according to the interaction between the kinds of manipulation and the cognitive style.

10-The students' level in chemical concepts' acquisition differ according to the interaction amongst the kinds of manipulation, the mental capacity, and the cognitive style.

IV- Research procedure :

In order to answer the questions raised in the research problem and to prove the research hypotheses, the following steps have been followed :

- 1-Content analysis of the two selected units in the chemistry course of first year, secondary stage to determine the main and subordinate concepts included in the those two units.
- 2-Reconstruction of the content structure of the two units to include the previously determined chemical concepts in the light of Ausobel's and Janet's models and preparation of teacher's guide and student's guide for the selected units.
- 3-Preparation of a test in the previously determined chemical concepts in order to discover the strategies in chemical concepts' acquisition and their acquisition level.
- 4-Selection of research sample amongst the first year students, secondary stage (N=84), and dividing them into three groups: two experimental groups and one control group. The first experimental group (N=30) studied the two units using Ausobel's model, the second experimental group (N=22) studied the two units using Janet's model, and the control group (N=32) studied the two units in the regular way.
- 5- Application of research tools to classify the subjects in each group by using mental capacity test and Payri test for cognitive style.

- 6- Selection of research subjects to apply the experimental tasks to determine the strategies for chemical concepts' acquisition and their acquisition level. The number of subjects inside each group was 16 students.
- 7- Application of experimental tasks on the subjects of the three groups in the form of group discussion sessions; 8 students in each session and 4 sessions for each group. The total number of sessions was 24 which took 30 hours.
- 8- Analysis of tasks' protocols to determine the strategies used in chemical concepts' acquisition and their acquisition level; they were 184 written protocol.
- 9- Estimation of results.

V- Research results :

- 1- There are significant statistical differences between the experimental and control groups in the mental capacity about using strategies for chemical concepts' acquisition. The level of significance was 0.01.
- 2- There are significant statistical differences on the level 0.01 between the experimental and control groups in the cognitive style about using strategies for chemical concepts' acquisition.
- 3- There are significant statistical differences on the level 0.01 between the experimental and control groups that studied the two units using the organization of content structure models about using strategies for chemical concepts acquisition.

- 4- There is statistically significant effect of the kinds of manipulation in general on the acquisition of chemical concepts. Ausobel's model surpassed the others.
- 5- There is statistically significant effect of the mental capacity on the acquisition of chemical concepts. The effect differs according to the kind of task.
- 6- There is statistically significant effect of the cognitive style on the acquisition of chemical concepts. The effect differs according to the kind of task.
- 7- There is statistically significant effect of the interaction between the kinds of manipulation and the mental capacity on the acquisition of chemical concepts. The effect varies according to the kind of task.
- 8- There is no statistically significant effect of the interaction between the mental capacity and the cognitive style on the acquisition of chemical concepts.
- 9- There is no statistically significant effect of the interaction amongst the kinds of manipulation, the mental capacity and the cognitive style on the acquisition of chemical concepts.
- 10- There is no statistically significant effect of the interaction between the kinds of manipulation and the cognitive style.

VI- Recommendations.

VII- Suggestions for further studies.