Introduction: Most of recent research in the field of education strongly recommends the use of visualization in the daily teacher’s practice, especially when it comes to teaching science.

Objectives: We investigated the impact of different kinds of visualization on student’s accomplishments, and the relationship between 2D and 3D visualization on the learning outcomes in biochemistry teaching, as well as gender-related differences in 2D vs 3D perception abilities.

Materials and Methods: The research study was conducted on a sample of 149 senior secondary school students, divided into three groups: control group (usual teaching approach), and two experimental groups taught using different kinds of visualization: E1 (2D and 3D static visualization tools), and E2 (3D dynamic visualization tools, in addition).

Discussion and results: We measured the students’ learning outcomes in biochemistry, as well as the level of satisfaction with different teaching methods. The data were interpreted by performing statistical measures and analyses. In order to validate our hypothesis, we used one-tail and two-tail ANOVA analyses (along with the t-test).

Conclusions: There was no statistical significance regarding 2D vs 3D visualization tools in biochemistry teaching. Although there existed some gender-related differences in students’ achievements (in favor of females), it was not established that they were related to the type of visualization (2D or 3D) tools applied. However students from the E2 group (additional computer animations) were more interested and involved in this kind of teaching. Although the results do not show a statistical significance in favor of 3D visualization, we must conclude that in teaching biochemistry it is certainly a more efficient approach than traditional teacher-oriented lessons. By using this kind of visualization tools in everyday teaching practice, chemistry teachers are given the opportunity to enlighten students with somewhat complex and abstract biochemical concepts.

Key Words: Biochemistry; Teaching; Visualization.