

Abstract

Freshman Students' Skills in Graph Interpretation and Construction at Birzeit University

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This study aimed at investigating the freshman students' abilities to interpret and to construct graphs. Two hundred and ten students from science and engineering colleges participated in this study, of which 108 were females and 102 were males. This sample was about 31% of Birzeit University science and engineering freshman classes of the academic year 2000/2001.

The study attempted to answer the following questions:

1. What is the freshman students' level in graph treatment? Does their achievement differ from the standard level (60% score)?.
2. Are there any significant differences in graph skills between students that are related to gender?
3. Are there significant differences in graph skills between students that are related to their specialization?.
4. Are there any differences in graph abilities between students who were graduated from public or private schools?.
5. What is the relationship between students' abilities in graph skills and their school achievement in physics and mathematics?.
6. What are the common alternative concepts and the main difficulties in graphing?

Students completed the Graph Interpretation and Construction Test (GICT) which was designed by the researcher. GICT consists of two parts: Part one consists of 15 multiple choice items focusing on the interpretation

skills, while part two consists of two questions each of which asks students to plot a graph using ready data. In addition to the main instrument, the researcher has attended ten classes of physics and mathematics at four secondary schools.

- The final results of this study indicated that the subjects skills in graph treatment were poor, their performance average was 53% which fell short of the acceptable level.
- Neither gender nor the type of school had any effects on graph interpretation and construction skills.
- Engineering students achievement was significantly better than science students, the first group students scored 56% average whereas science students scored 50% average.
- A weak positive correlation was observed between students graphing skills and their achievement in physics and mathematics (tawjihi).

Students in this study, showed many misconceptions or misinterpretations when working with graphs, the most common errors were:

a) confusing the meaning of the slope of a line with the height of a point on the line. b) thinking that the graph is a picture of the situation. c) linearity of scaling. On the other hand, students had the following difficulties in dealing with graphs: 1) Curves' interpretation 2) Translating graphs into scientific language vice versa. 3) Dealing with graphs representing negative physical quantities. 4) Connecting graphs and their equation constants.

This study recommended that students should learn graphs interpretation and construction skills in both science and mathematics classes. Teachers are recommended to allow their students to have major roles while teaching graphs. In addition, many future studies could be done about graphs using other societies and areas besides science.