

Exploring the Impact of Mathematical Software and Its Result Shown on Higher Education

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Abstract— The objective of this research paper focus on Researcher/Academician academic development in Higher Education. Teaching and learning processes will be improved. Find the main difficulties existing in teaching methods and learning way. We can say that Mathematical software shows as an excellent way to help the teaching and learning methods. This is especially useful for interdisciplinary courses like some problems interventions were applied to find the main difficulties in the teaching and learning methods.

Keywords— GeoGebra, MATLAB, Mathematical Software, Phet Simulation and Computer System.

I. INTRODUCTION

Teaching and learning are very complicated methods. General cognitive complexity of mathematics is a reflection of the nature of learning and teaching mathematics, can be characterized in many dimensions. Mathematical learning methods are both an individual and a social process; each concept is connected to something. Mathematics is structured like a complex web network, due to many displays, different type of representations, and link between them [3],[7],[8],[9],[10] & [11]. The connection between a parabola, lines, conics, dots, squares, surface area, free fall, and other characteristics may be known. A parabola can be Known by seeing at its relations with lines, conics, dots, squares, surface area, free fall, and other similar aspects. It is represented by numeric, algebraic, and geometric displays, as well as their relation. A mathematical display is a cultural artifact that reflects a society's technological and cultural development [13] Mathematics structure has influenced technology achievement, but technology achievement has changed how mathematics is taught.

II. RELATED WORK

Mathematical tools, a dynamic mathematics software, combines geometric and algebraic constructions. By providing practice, GeoGebra reinforces the learning of mathematical concepts for students. exercises GeoGebra is a powerful educational tool for teachers, because it creates interactive learning environments online. In different software, geometry, algebra, and calculus are combined into a easy single package for learning and teaching mathematics [5]. The educational software program

GeoGebra is specifically designed to help students learn mathematics experimentally, problem-oriented, and research-based, both in the classroom and at home.

The computer algebra system and the interactive geometric system can be used simultaneously by students; Computer algebra systems and interactive geometric systems can be used simultaneously by students. To increase students' cognitive ability, teachers can use different software applications. Mathematical software provides students with opportunities for experimentation and guided discovery. Due to its dynamic worksheet quality, Mathematical software can also be used without students needing to learn the software.

Mathematical software is a software that makes students to use it without having to learn the software because of its dynamic worksheet uses. Mathematical software, a tool that has active applications in math teaching activities, can be benefited to develop interactive and creative visual implementations in algebra and geometry subjects through dynamic worksheets [1] & [2].

Quadratic function is an useful concept for calculus but the Academician at higher education have many difficulties related to Quadratic Function. It is important that the teaching of this concept is observe considering the Academician thinking. The aim of this study conducted through a qualitative case study is to reveal the concepts in a Academician brain and underlying reasons while analyzing a quadratic function and drawing its graph. given quadratic function was a linear function. algebraic representation to graphical representation that its graph was a parabola and the parabola was opening upwards or downwards.

III. METHODOLOGY

1. Pre knowledge testing: The pre knowledge testing will be carried out to identify previous knowledge and skill related to subject area and their weaknesses and strengths.
 - i. Recognize General Error:
 1. Consider the function as a formula.
 2. Consider the function as a process of operation.
 3. Consider the function as a type of formula that is used for drawing graphics.
 4. Problems in solving and interpreting the graphic due to consider the function's graphic as a fixed object.
 5. Considering that a function can be express with algebraic formula, and failing to learn piecewise functions.
 6. Lastly the objective of this study is to examine the effect of instructing quadratic functions use of Mathematical software and guided discovery worksheets on Academician' achievement and level of reaching acquisitions.
2. Identifying the difficulties level in teaching processes and learning problems:
 - a. Firstly we will taken sample/Participants any class of 30 students have been select both as sample and participants for interview by simple random sampling method examine pre test after then given best treatment by post test.
 - b. Then we will detect the significant difference between achievement scores and academic score.
 - c. After that finding the levels of teaching and Studying acquisitions for experimental and control groups?

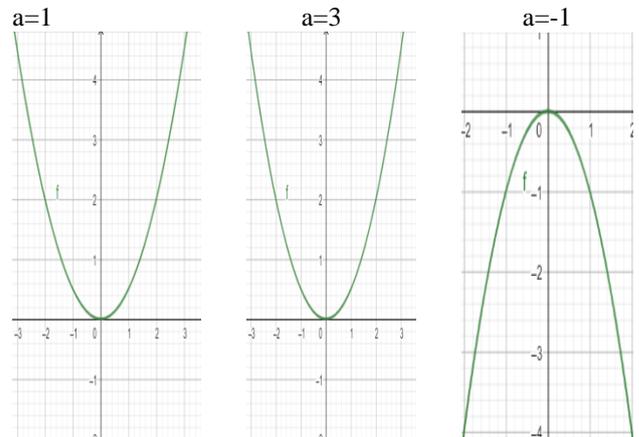
IV. PREPARE A MATHEMATICAL MODEL

- a. An Practical design with a pre-test and post-test control group was used in this study.
- b. According to the Practical design , two groups - one is a test group and the other is a control group - were randomly selected after an unbiased assignment.
- c. The method taken in this study was practical. The purpose of an practical study is to find the causal relationships between variables by examining an event, phenomenon, object, subject, or factor, comparing and finding the results.
- d. The practical method used in this learning is called the "pre-test & post-test control group design." As part of the study, the control group Academician did not receive any intervention while the practical group students were taught Mathematical Software developed in the computer lab along with guided discovery worksheets.

V. EXPERIMENTAL METHOD/OBSERVATION METHOD

$$y=ax^2+bx+c$$

a represented as Stretch, opens/down:- As the value of a increases the graph becomes steeper and open up as the value of a decreases the graph becomes opens down above quadratic Equation we put b=0 and c=0. Then only a variate impact is shown below

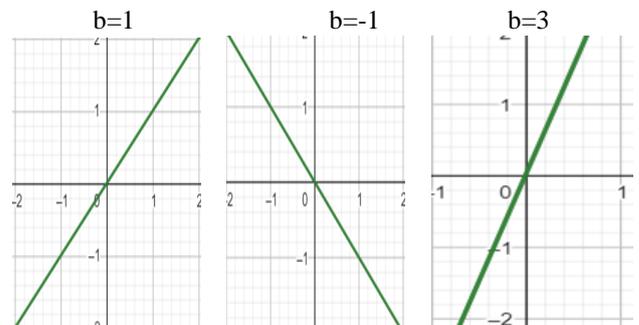


b is represented as slope at y intercept.

Slope: The trigonometric tangent of inclination

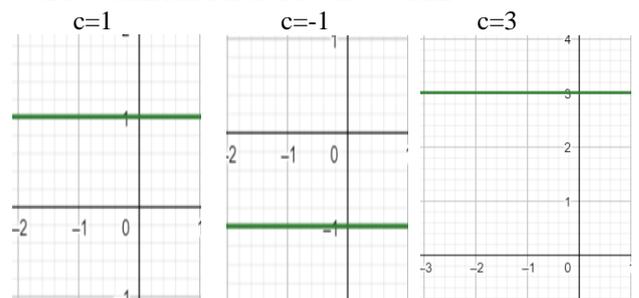
Inclination: The angle measured from positive x-axis. If any line is more straight then slope is more and if line is steeper this slope is less.

ABOVE QUADRATIC EQUATION A=0 AND C=0 ONLY B VARIATE IMPACT IS SHOWN BELOW



c represented as y intercept shift up/down

ABOVE QUADRATIC EQUATION A=0 AND B=0. THEN ONLY C VARIATE IMPACT IS SHOWN BELOW



VI.CASE STUDY METHOD

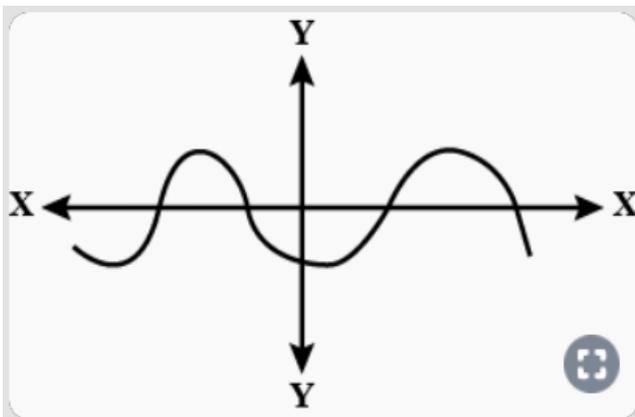
1. Three Academician in the park doing some activity. When the activity were closely observed it was found that parabola exist in real life there were many different shapes which were indirectly parabola. In the figure, one can observe that poses can be related to representation of



The form of the pose shown is
 a) Spiral b) Ellipse c) Linear d) Parabola
Ans: d)

The graph of parabola opens descending , if -----
 -
 $a \geq 0$ b) $a=0$ c) $a<0$ d) $a>0$
Ans: c)

In the graph, how many times the graph intersect x-axis ?



a) 0 b) 1 c) 3 d) 4
Ans: d)

VII.DATA COLLECTION TOOLS:

An acquirement test of Quadratic Functions was pre-owned as a data grouped tool in the study. The tests given to the Academician at the origination and at the end of the study as a pre-test and post test were developed in a multiple choice. type of test. The acquirement test was comprises of four items, each of which took the form of a question to calculate each acquisition in sub-learning field of quadratic functions.

VIII. PROCESS

In practical group, as a first group of activities; discovery sheets were given to students to discover the properties of functions. In implementation of discovery sheets, Academician filled in the blanks in each question which is made to help Academician to be find properties. The discovery sheets need individual work of Academician with Mathematical software. The acquirement test that was made in this study was applied as a pretest and a post test before and after the execution. Then, exercises and worksheets were organized using Mathematical Software for the instruction of 'quadratic functions' subject.

IX. RESULTS AND DISCUSSION

The study will improve to be important to intervention the misconceptions in understanding the concepts of mathematics and physics subject. Mathematical software and simulation techniques make mathematical modelling more dynamic.

Using examples that were developed to examine these effects, teachers can provide guidance concerning the type of teaching surrounding that should be made to unite digital learning into classrooms.

It also provides many advantages like a formula, graph, and numerical table for comparisons. Students can use this tool to examine the effect of limitation changes on the graph of functions. This implementation helps students focus on qualitative analysis, instead of complicated calculations.

With this modelling approach, the teacher encourages students to learn mathematics, promotes interdisciplinary implementation, and brings the methods of teaching closer to the student's reality. This study will help student-teachers to recognize the teaching methodology for the different category of students.

It should include important findings discussed briefly. Wherever necessary, elaborate on the tables and figures without repeating their contents. Interpret the findings in view of the results obtained in this and in past studies on this topic. State the conclusions in a few sentences at the end of the paper. However, valid colored photographs can also be published.

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