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THE USE OF CHART AS A MATH PRE-CLASS PREPARATION

Abstract:

Teaching mathematics in weak students is one of the most challenging jobs. That is due to the fact that those students lack the abstract concepts and logical procedures needed to establish logical techniques that allow them to understand higher complex problems they might face afterward. Thus, it is needed to implement an innovative teaching method to maximize students' motivation, and so the performance. Moreover, the necessity of easing the difficulties in mathematics pushes instructors to find an effective ways in order to simplify the learning objectives. Modelling the learning concepts using charts as mini-lecture is one of these methods.

The author made a comparison in this paper between two Elementary Algebra course groups in Foundation Program at Qatar University. Using the traditional teaching method for one group and the charts method as preparation before lectures for the other one gave an indicator about the effectiveness of the mentioned method and shows whether the students have stepped toward more understanding of the course objectives.

Keywords:

ACCUPLACER, Charts, Learning Objectives, Modelling, Students, Universities

1. INTRODUCTION

Nowadays, innovative teaching methods are considered among the top important strategic priorities for most universities around the globe. As a result, the use of technology becomes more likely to attract learners' attention and allows the expansion of using materials in the education field. In recent decades, quick changes have occurred worldwide. Then, these developments have affected the teaching methodologies in order to meet the new required standards and interests according to the modern education system.

There is no doubt that applying creative instructional methods in teaching improves learners' performances. One of these methods is visualizing learning objectives using charts. This method is considered the cornerstone in graphic organizer technique, namely using tables, diagrams and matrices. This technique eases the principal difficulties and help in modelling mathematical problems into simple categories. Learning objectives set up the targeting outcomes of the course. Precisely, these objectives gain the skills or knowledge that students should get towards the development of the course. Most importantly, the course learning objectives form an important guide for course's progress (SWARTZ, 2012).

The use of technology as a helpful tool can surely add vital value to the learning cycle. Videos encourage students' curiosity, speculation, and intellectuality. Additionally, these modern tools enable students to use higher-order cognitive skills to increase their knowledge (DENNING, 2009).

At Qatar University, most students who enrolled in the Elementary Algebra course in Foundation Program have the same mathematical skills background. This is due to the fact, all enrolled students in Elementary Algebra got approximately the same grade in the accredited placement test 'ACCUPLACER'. According to that fact, a comparison between two Elementary Algebra course groups would give an accurate indicator on how charts methodology affects students' performance in mathematics, taking in consideration, one of the two groups was taught using charts method, while the other being applied the traditional instructional method.

This paper is presented as follows, section 2 gives the definition of charts method and shows the main tasks of using it, section 3 exhibits the main types of charts method used by the author, moving to section 4, a comparison between two students groups states the positive effectiveness of using the charts method, in section 5, the benefits of using charts method are listed in supporting learning mathematics, finally, the results of charts methods and recommendations are summarized in the last paragraph, namely section 6.

2. WHAT THE CHARTS METHOD STANDS FOR

To begin with, more knowledge is needed to race the developments occur in education field. Thus, organizing lots of information within clear frame is required to guarantee an easy access to it. One among these methods is what called the chart method. Graphic organizer is the main methodology where charts method belongs to. For instance, Flowchart, Modelling chart and Comparing table. Chart is a visual tool used to give an overview covering the learning objectives

and to show relationships between facts, terms, and or ideas within a learning task (STRANGMAN, HALL, MEYER, 2003). Rather than adding new information, charts method is an enhancing of the old established knowledge, so that, learners would understand the function of learning objectives in a short time.

3. CHART TYPES

Determining the right charts to be used would increase the effectiveness of the designed charts and characterize the type of them. Mainly, three types of charts have been used in teaching Elementary Algebra course. The first chart is the Flowchart. For instance, Fig. 1 shows the mechanism of solving quadratic in form equation. This technique helps to organize solving procedures in simple steps.

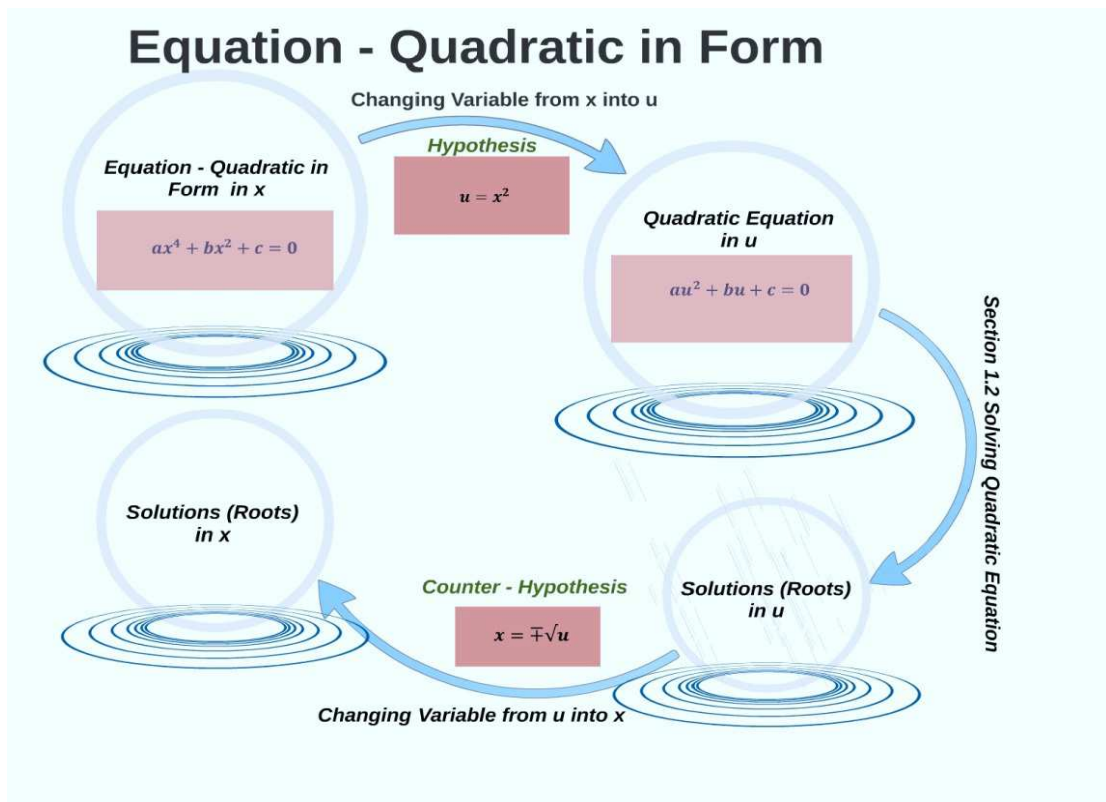


Fig. 1: A Flowchart of Quadratic in Form Equation.

The second kind is the modelling chart, in this style of chart the main task is to categorize learning problems in specific classes to simplify their solutions, especially among weak students who cannot find out what the essence of a particular problem is.

For example, Fig. 2 shows that having a particular information related to a line allows students to determine its both graph and equation. It is clear that using this type of charts, students will have an explicit view of what tools they have, and what they are looking for in order to solve the problem.

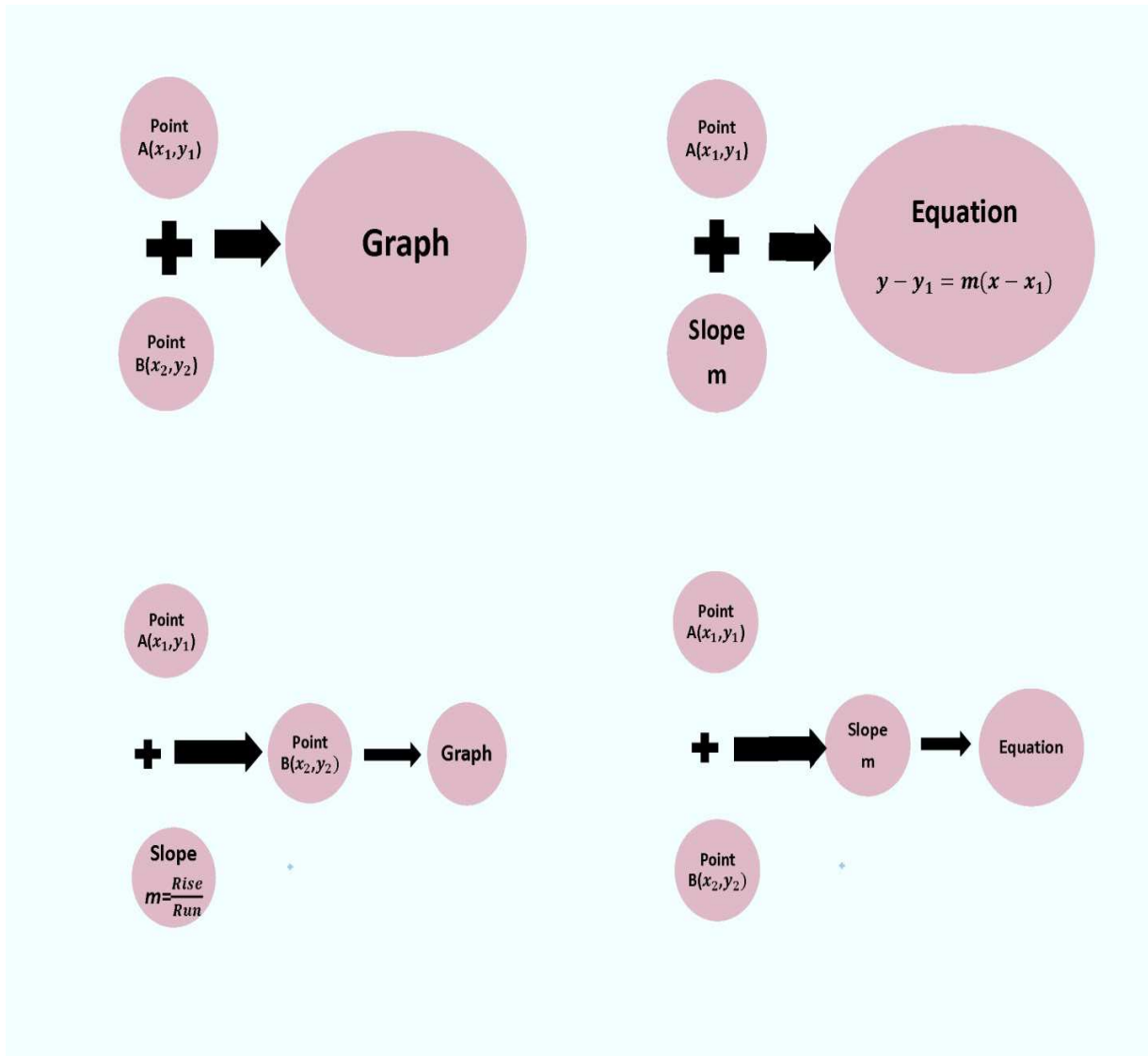


Fig. 2: A Modelling Chart of Graphing and Writing the Equation of a Line.

The third type of charts is the comparing table. This method focuses on the differences and similarities between closely related concepts.

For instance, Fig. 3 shows the relation between four graphed lines in four different situations. This technique would help students who are suffering from distinguishing the similar leaning objectives to catch the key concepts in these problems.

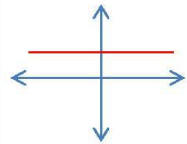
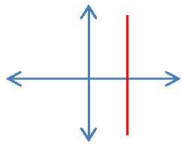
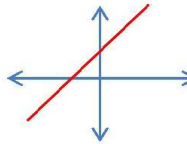
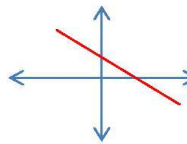
<i>CASE</i>	<i>HORIZONTAL</i>	<i>VERTICAL</i>	<i>INCREASING</i>	<i>DECREASING</i>
<i>EQUATION</i>	$y = \text{Number}$	$x = \text{Number}$	$y = \text{positive } x + b$	$y = \text{negative } x + b$
<i>SLOPE</i>	0	Undefined	Positive	Negative
<i>GRAPH</i>				

Fig. 3: A Comparing Table of Four Possible Line Situations in the Plane

4. COMPARISON: THE EFFECTIVENESS OF USING CHARTS METHOD

Comparing the results of the students in groups used charts method by the results of those in other groups used other teaching methods is an essential indicator about the effectiveness of charts method. At Qatar University, the course selected for this comparison is Elementary Algebra course, many students enroll in this course to gain basic mathematical skills in order to be able to apply these skills in the coming after courses. The fact that a placement test 'ACCUPLACER' is required as a pre-request before registering in this course gives a guarantee that all students who register in Elementary Algebra have approximately the same mathematical abilities. Also, since unified web based assessments are used in the mentioned course depending on the web based software 'MyLabsPlus', this guarantees that all students enrolled in the course undergo the same assessment levels of difficulty. These two facts give the comparison more credibility and allow authors to provide a fairly judgment in terms of how students interacted and how far they moved forward during this course.

In the comparison, students of Elementary Algebra were categorized into three categories:

- Category 1: students taught using charts method.
- Category 2: students taught using traditional instructional method.
- Category 3 : all students enrolled in Elementary Algebra course where malicious methods of teaching are used.

Tab.1 summarizes the results of the three categories outcomes and the quality of performances of them. It compares the average of the students' overall scores and the passing rates for each category.

Also, it compares the percentages of the students who failed to complete the course '**Barred Students**' and the percentages of the students who scored more than or equal to 80 among passed students '**Quality of Passing**' for the three categories.

	Average/ NO. Students	Passing Rate	Barred Students	Quality of Passing
Category 1 (46 students)	78.5%	78.8%	28.3%	73.1%
Category 2 (33 students)	72.2%	63.2%	42.4%	58.3%
Category 3 (759 students)	72.9%	65.2%	30.3%	68.1%

Tab.1: The Comparison Between Two Elementary Algebra Groups

A look into the table taking in consideration the factored mentioned in the beginning of the comparison gives a clear idea about the positive effects of charts method especially if it is compared by the traditional teaching method. The shift in the students' average and the reduction in the drop rates give an indicator about increasing the level of interest of the students in category1 in the course. Also, the increase in the passing rate and the quality of passing at the same time give an indicator about a more understanding of the course objectives for the students in category1 compared to the other two categories.

5. CHARTS METHOD BENEFITS

In many ways, charts help in memorizing the prior information. Thus, students can use them to recall information that is related to last experiences. The use of charts methodology can be made as a pre-course preparation before class time, or as a quick test preparation. Additionally, charts are used to ease the difficulties in complicated concepts, especially when students get stocked to specific question and cannot find a schema to understand it. Many studies state that learners do not pay attention continuously during a long time lecture (BUNCE, FLENS, NEILES, 2010), consequently transferring the key concepts during the time of concentration would affect learners understanding and the class outcomes in a best way. Thus, using charts as pre-class preparation can be a successful tool to attract the attention and guarantee the maximum level of concentration during the class time.

The purposes of using charts can be summarized as follows (ELLIS, 2004):

- Understanding the subjects and clarify the relationships between objects.
- Organizing the ideas and improve the chances to remember them.
- Motivating students to be interactive during the class.
- Providing more abstract comparisons, evaluations, and conclusions.
- Helping students to focus on studying basic information.

6. CONCLUSION AND RECOMANDATIONS

Innovative teaching methods are essential for a modern learning environment. Charts method is one of these demanded methods that gains students attraction and enhances the level of objectives understanding. The shifts illustrated in this paper can only emphasize on the significant impact of this method on the students at all levels. And the wide range of charts types that can be used to serve particular objective is what gives this method its strength.

Charts method is effective for courses with step-by-step objective oriented syllabus. It can be also improved to be a part of the larger graphic organizer method for most types of courses. After all, a successful teaching method is a method flexible enough to fit the widest range of courses a tutor has to teach.

7. ACKNOWLEDGEMENT

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