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Review Of Literature On Analysis Of Numerical Approaches Related To Non Linear Dispersive Equations And Its Application

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Abstract: The findings revealed that the majority of the participants only acquired instrumental understanding rather than relational understanding in their algebraic lessons. From the researchers' observations, participants' fundamental knowledge in algebra needs to be improved in order for them to be able to solve any problems that are related to algebra. When tasked to solve problems that required them to change the subject of a given formula, all students used the changing the operation method, namely, by bringing unwanted terms to the other side of the equation.
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Introduction:

In the present study, the review of literature in the present study i.e., STUDIES ON ANALYSIS OF NUMERICAL APPROACHES RELETED TO NON LINEAR DISPERSIVE EQUATIONS AND ITS APPLICATION is related to study on new techniques for solving non-linear equations, study on non-linear equations, and comparison between Sine-Gordon and Perturbed NLS equation is summarized. many of those who could did not understand the implications of the factorised form for finding the roots. Conceptual errors were invariably preceded by procedural errors. Sometimes the two were intertwined (DETE, 2013).

There was evidence that teacher interpretation of curriculum guidelines resulted in overemphasis of symbolic factorization processes. The results suggest a lack of alternative pedagogies such as links to geometric models recommended by some authors and the integrated use of graphs in contexual settings (Barnes, 1991; Howden, 2001; Norton, 2015). Geometric models are useful in adding understanding in developing the quadratic formula via completing the square procedure (Norton, 2015). Barnes (1991) suggested using graphing calculators to plot quadratics with no roots, one root, or two roots and linking this to the discriminate values. Research suggests that teachers tend to avoid teaching alternative methods due to high instances of process skill errors with techniques such as the quadratic formula and completing the square (Zakaria et al., 2010). From this literature review, it is clear that there is a need for further research into the sources of students' difficulties with quadratic equations. APOS theory will be used as theoretical framework to study the level of cognitive development of students who completed a precalculus course using a traditional lecture/recitation model, as discussed by Arnon et al. (2013). APOS theory was chosen since it has been used to study student learning of a variety of different mathematical concepts and has proven to give important insights on students learning of mathematics has an annotated bibliography). Also, it has been tested in the classroom and has proven effective in promoting students' learning of different concepts and guiding the development of classroom activities by Arnon et al. (2013).

Review of Literature:

Sfard and Linchevski (1994) have analysed the nature and growth of algebraic thinking from an epistemological perspective supported by historical observations. They indicated that the development of algebraic thinking was a sequence of ever more advanced transitions from operational (procedural) to structural outlooks.

Mason (2000) has argued that "... the style and the nature of questions encountered by students strongly influences the sense that they make of the subject matter". The questions that come to the mind of an educator are influenced by the perspective and disposition that he/she has towards mathematics and pedagogy. These questions in turn influence the sense learners make of the subject matter. In this article I focus on the outcomes and implications of research on (a) use of symbols in mathematics, (b) algebraic/trigonometric expressions, (c) solving equations, and (d) functions and calculus.

When introducing algebra the use of letters should be withheld until it is evident that learners are ready for their use, and teaching should recognise and prepare learners for the various uses of letters in algebra as the need arises (Harper, 1987; Stols, 1996).

The Historical Roots of Elementary Mathematics (Bunt, Jones, & Bedient, 1976) is very similar in style and information to Math through the Ages. Both books present information in short chapters specific to a main idea (e.g. Greek numeration systems). In addition, both books cover a wide range of topics that are broken down by date. However, The Historical Roots of Elementary Mathematics does not delve into the stories describing the people behind the discoveries. The four volume collection.

The World of Mathematics (Newman, 1956) consists of individual articles compiled together in an effort to convey the "...diversity, the utility and the beauty of mathematics" (Newman, iii). Newman attempted to show the richness and range of mathematics. This collection spans ideas from the Rhind Papyrus to the "Statistics of Deadly Quarrels" (Newman, 1956).

The World of Mathematics presents an amazingly broad view of the many applications of mathematics to the sciences. An Introduction to the History of Math (Eves, 1956) covers the same topics as several of the other books, in much the same manner. It traces the development of mathematics from numeration systems through to the development of calculus. It includes specific information of the individuals that developed many of the critical ideas in the history of mathematics.

Boyer's (1968) A History of Mathematics is almost entirely about Greek mathematics. It covers ancient Greek mathematics to a degree that none of the other mentioned texts do. Perhaps one of the most valuable tools for a secondary teacher available is Historical Topics for the Mathematics Classroom (National Council for Teachers of Mathematics, 1989).

This text consists of a series of "capsules" (short chapters). Each capsule gives a brief historical overview of a particular topic (e.g. Napier's Rods). The capsules are grouped by general topic (algebra, geometry, trigonometry, etc.). Specifically, this text provides a historical context to graphical approaches to equation solving. In addition, it provides a concise overview of the methods employed to solve quadratics and cubics.

Various researchers (Vaiyavutjamai & Clements, 2006) have illustrated that very little attention has been paid to quadratic equations in mathematics education literature, and there is scarce research regarding the teaching and learning of quadratic equations.

A limited number of research studies focusing on quadratic equations have documented the techniques students engage in while solving quadratic equations (Bossé & Nandakumar, 2005), geometric approaches used by students for solving quadratic equations (Allaire & Bradley, 2001), students' understanding of and difficulties with solving quadratic equations (Kotsopoulos, 2007; Lima, 2008; Tall, Lima, & Healy, 2014; Vaiyavutjamai, Ellerton, & Clements, 2005; Zakaria & Maat, 2010), the teaching and learning of quadratic equations in classrooms (Olteanu & Holmqvist, 2012; Vaiyavutjamai & Clements, 2006), comparing how quadratic equations are handled in mathematics textbooks in different countries (Saglam & Alacaci, 2012), and the application of the history of quadratic equations in teacher preparation programs to highlight prospective teachers' knowledge (Clark, 2012).

In general, for most students, quadratic equations create challenges in various ways such as difficulties in algebraic procedures, (particularly in factoring quadratic equations), and an inability to apply meaning to the quadratics. Kotsopoulos (2007) suggests that recalling main multiplication facts directly influences a student's ability while engaged in factoring quadratics. Furthermore, since solving the quadratic equations by factorization requires students to find factors rapidly, factoring simple quadratics becomes quite a challenge, while non-simple ones (i.e., ax2 + bx + c where a ^ 1) become harder still. Factoring quadratics can be considerably complicated when the leading coefficient or the constant term has many pairs of factors (Bossé & Nandakumar, 2005).

The research of Filloy & Rojano (1989) suggested that an equation such as with an expression on the left and a number on the right is much easier to solve symbolically than an equation such as. This is because the first can be ‘undone’ arithmetically by reversing the operation ‘multiply by 3 and subtract 1 to get 5’ by ‘adding 1 to 5 to get and then dividing 6 by 3 to get the solution.

Meanwhile the equation cannot be solved by arithmetic undoing and requires algebraic operations to be performed to simplify the equation to give a solution. This phenomenon is called ‘the didactic cut’. It relates to the observation that many students see the ‘equals’ sign as an operation, arising out of experience in arithmetic where an equation of the form is seen as a dynamic operation to perform the calculation, ‘three plus four makes 7’, so that an equation such as is seen as an operation which may possibly be solved by arithmetic ‘undoing’ rather than requiring algebraic manipulation (Kieran, 1981).

Tsai et al. (2012) analyzed visual attention for solving multiple choice science problems. Studies showed that successful problem solvers focused more on relevant factors while unsuccessful problem solvers experienced difficulties in decoding the problem, in recognizing the relevant factors and in self regulating concentration. Kuo et al. (2012) experimented a hybrid approach to promoting students web based problem solving competence and learning attitude. Results show that middle and low achievement students in the experimental group gained significant.

Yeung (2010) Studied the impact of problem based learning on a preuniversity geography class. Results showed that students could analyse problem statements and presents their understanding systematically but varied considerably in organization, argument and quality of thinking.

Simone (2008) examined the impact of problem based learning on prospective teachers problem solving abilities. The participants in problem based learning were significantly better in constructing, elaborating, relating their solutions to the problem and using multiple resources than the control group following the traditional approach.

Van Hiele (1986) provides a growth of perception of geometric figures, where operations on figures produce geometric constructions and reasoning develops in sophistication through Euclidean definition and proof.

Detailed discussion of all these aspects can be found. However, the main purpose of the theoretical framework is not to collate all these theories together with all their intricate details that differ in many ways, but to seek the fundamental essence of essential ideas that they have in common Tall (2013).

Following Skemp (1979), whose theoretical framework builds from perception (input) and action (output) and becomes increasingly sophisticated through reflection, the three-world framework builds on the tripartite structure of perception, operation and reason. All three of these aspects arise throughout mathematics.

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