

Assessing the Effect of Implementing Mathematics History with Algebra

Manoj Dubey*, Dr. Basant Singh**

* Research Scholar, Indore

** Principal, AISECT University, Bhopal

Abstract- This paper presents the outcomes of the impact assessment of the history of Algebra over the period 2012-2013, carried out between June 2012 and March 2013. The analysis was performed using a methodology based on the triangulation of information arise from different actions: desk study, assessment of partakers and statistical data analysis.

Index Terms- History, History of mathematics, History of Algebra, Historiography

I. INTRODUCTION

The purpose of this research was to assess the effect that lessons involving the history of mathematics would have been on motivating students. Research indicates that student interest in mathematics is a sign of student success. Globally, the use of history to enrich mathematics teaching has grown in popularity.

A review of literature has been included to show that algebra has grown through a motivating, interrelated history of individuals and philosophies. Some scholars sustain the stages of this history correlate with the way of students-learning. Other educationalists who have implemented history in the classroom found positive influences on student attitude.

This paper included personal ideas, were tested in various classrooms during the 2012-2013. The pre/post student surveys were given to measure any change in attitudes and to give specific feedback on student feelings about using history in Algebra. Statistical analyses show that the pupils who were viewing to the history had a more positive attitude of mathematics than those who were not given the history lessons.

II. METHODOLOGY

2.1 Procedures

One hundred sixty students of a particular science college at Indore were asked if they could take fifteen minutes and complete a survey. The undergraduates were first requested to read and sign a consent form (see Appendix A). The signed consent forms were then placed into a packet so the names of each of the students would remain confidential. They were asked to read the directions and answer the questions as honestly as they possibly could. It was brought to their attention again that their answers will be kept completely confidential and their names could not be matched with their answers. All of the participants were tested under the same basic conditions. They were asked to complete the survey in their regular class rooms.

After the students finished and fill out the rest of the survey, they were all thanked for helping me with my research work.

2.2 Literature Review

One idea that has gained momentum in the past few decades is teaching mathematics through history. Many researchers acknowledge the importance of history of mathematics in mathematics teaching and learning.

In 1985, D' Ambrosio indicated that the study of mathematical evolutions from the peoples' and cultures' may be used to help people in their lives, and how it is or was used by different cultures. Katz (1993) pointed out that history of mathematics can help students understand the origin of this science and how it evolved. Garner (1996) concluded that "the study of history is essential for those who would attempt to teach mathematics." According to Harakbi (1994), a "retrospective look at the historical development of mathematics allows the teacher to refresh and deepen both the understanding of a specific topic and ethical ways of presenting it. Zaslavsky (1994) pointed out that the students have minimum opportunities to understand the origins of mathematics and the role of the various peoples in its creation. Ascher and D'Ambrosio (1994) indicated that the lack of any emotion in mathematics lead to the dislike of the subject on behalf of the students. Bishop (2001) indicated the explicit value teaching that is possible to take place in a mathematics classroom. Acknowledging the values that may emerge can give the mathematics teachers the chance to be mathematics educators and not just trainers. In this way they may also contribute to the moral and spiritual growth and maturation of their students. Shirley (2006) supports that it can be used to teach students the mathematics that needs to be covered according to the curricula and at the same time inform the students about the contributions and the practices of the various cultures around the world. The work of Lawrence (2006) revealed that using history when teaching mathematics to students may help in the increase of the students' motivation, initiatives for investigations and communication skills. Radford and Puig (2007) support that teachers' awareness and use of historical sources may facilitate the understanding of their students. Anderson's (2010) work revealed that using material related to the students' reality may not only introduce connections between mathematics and societal issues, but also help students achieve agency and social empowerment. Rogers and Fairchild (2010) worked with students on solving quadratic equations using the Mesopotamian and early Hindu method that later lead to the completion of the square. The students' attention and participation had increased and Rogers and Fairchild (2010) pointed out that looking at a problem from an historical

perspective, reveals aspects such as estimation, explanation and simplification.

2.3 Questionnaire survey and statistical data analysis

A data was collected and compiled for statistical analysis on scientific basis. The objective of the data analysis was also generating some creative and informative indicators. The purpose of the survey was to gather views on the impact of the history teaching in algebra. The data used for this purpose is a combination of data provided directly by the survey and the literature review. In the survey, almost 160 students answered, which makes a 67% gross response rate. Given the short period of time we can consider it is a very good rates of evaluation studies. After leaning the answers database, 196 answers have been taken into account for the analysis of results, which makes a fairly 63% net answer rate.

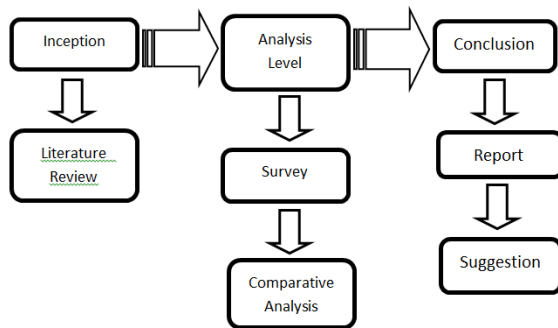
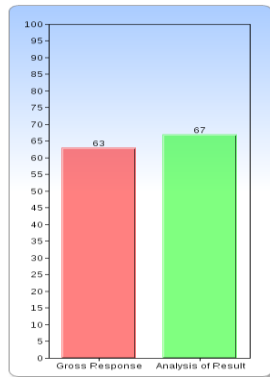


Figure 1: Flow of the analysis

2.4 Comparative analysis

The purposes of the comparative analysis were:

- To assess the effectiveness of the implementing mathematics history in comparison to present teaching technique.

The comparative analysis was grounded on the following:

- The review of the completed survey and evaluations,
- The review of literature and documents available online,
- The review of assessable data from this research work and their results.

In this section we cover the evaluation questions related to the effectiveness of implementation of history of mathematics with algebra i.e. to what extent this work contributed to reaching the overall objective of enhancing algebra teaching through research and technological development activities. We analyse the extent to which work have achieved their specific objectives and hereby contributed to reaching the objectives of these work. From our analysis, it appears that in general, this work has been effective in:

- Enlightening and firming up the links between the history of mathematics and algebra.

- Enabling and increasing mutual learning between the partakers,
- Effectiveness of teaching when it includes history of mathematics to algebra.
- And, whenever it was our objective, contributing to improve learning of algebra.

III. CONCLUSIONS

A key result of this work is the strengthening and expansion of learning algebra. In addition, the establishment of new relationships of algebra with history of mathematics. The work has focused on supporting teaching of algebra with a pre-existing relatively strong research capacity. Most Participants are drawn notably from the graduation level. When coming to the conclusion of this work, outcomes reveal the prominence of use of history of algebra.

After the survey, we describe how including history in mathematics can be beneficial for undergraduates, instructors, prospectus makers and researchers in different ways. We give a number of logic frequently mentioned to illustrate this:

- Students can experience the subject as a human activity, discovered, invented, changed and extended under the influence of people over time. Instead of seeing mathematics as a ready-made product, they can see that mathematics is a continuously changing and growing body of knowledge to which they can contribute themselves. Learners will acquire a notion of processes and progress and learn about social and cultural influences.
- History accentuates the links between mathematical topics and the role of mathematics in other disciplines, which will help to place mathematics in a broader perspective and thus deepen students' understanding.
- History of mathematics provides opportunities for getting a better view of what mathematics is. When a teacher's own observation and understanding of mathematics changes, it affects the way mathematics is taught and consequently the way students perceive it. Teachers may find that information on the development of a mathematical topic makes it easier to explain or give an example to students. For instance, heuristic approaches provided by history can be contrasted with more formal, contemporary methods. In addition it is believed that historical knowledge gives the teacher more insight in different stages of learning and typical learning difficulties. On a more personal level, history also helps to sustain the teacher's interest in mathematics.
- Not only the mathematics teacher but also the educational developer or researcher can profit from history in studying subject matter and learning processes. It provides teachers and developers with an abundance of interesting mathematical problems, sources and methods which can be used either implicitly or explicitly. A short study of mathematical history is sufficient to conclude that its development is not as consistent as this law would require.

- In other words, we can find history helpful in designing a hypothetical learning trajectory and use parts of it as a guideline. For instance, Harper (1987) argues that algebra students pass through different stages of equation solving, using more sophisticated strategies as they become older, in a progression similar to the historical evolution of equation solving. Harper pleads for more awareness of these levels of algebraic formality in algebra teaching.

IV. RECOMMENDATIONS

Recommendations have been developed based on the conclusions of this research. They are presented below according to the survey:

- Use of history of mathematics is more beneficial in the study of algebra.
- It is recommended that the use of history of mathematics with algebra will improve the efficiency of teaching technique.

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AUTHORS

First Author – Manoj Dubey, M.Sc., M.Phil., M.A., B.Ed.
Ph.D.(Pursuing), Manojdubey.oist@yahoo.com

Second Author – Dr Basant Singh, Principal, AISECT
University, Bhopal(M.P.), Drbasantsingh73@gmail.com

Correspondence Author – Manoj Dubey,
manojdubey.oist@yahoo.com ,+919926079574