

A Study of Student's Behaviour for Integration of History of Mathematics with Algebra

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ABSTRACT

The motive of this paper is to study the behaviour of the students towards integration of the history of mathematics with algebra. For this research work, 580 students were taken as sample of study. Out of which 261 are girls and 319 are boys. Data collection tool was a questionnaire. The data was analyzed by using mean, percentage, standard deviation and t-test.

Keywords-History, Mathematics, History of mathematics (HOM)

I INTRODUCTION

There is a general opinion that students should learn through inquiry and through the construction of their own. As Von Glasersfeld (1995) state that – “learning is a process of construction in which the students themselves have to be the primary actors”.

Using history of mathematics is essential in active learning process. By learning activities of students, we mean their investigational work, problem solving, small group work, mutual learning and experiential learning. While solving a certain problem, every student has been proposed to investigate “mathematical situation” of it with persons own priorities for further inquiry of that problem. I consider “situation” as an issue ,which is a localized area of inquiry with features that can be modified, but in mathematical sense a certain problem was posed for the first time, who was the author, whether that author Proved/Solved a problem on person own. The mathematicians were interested in it, a problem was remained unsolved. I would like to consider the possibility of using principles of active learning in teaching mathematics through such historical environment.

The necessity of the work upon the same and following aroused in my mind:

II RESEARCH QUESTIONS

- (a) How are concepts formed in mathematics?
- (b) Which factors influence or change the meaning of concepts?
- (c) Is there an internal logic and order in the development of mathematical concepts?
- (d) What is the status of mathematics at graduate level?
- (e) What are the problems faced by the students?
- (f) What is the behaviour of students towards integration of the history of mathematics with algebra?

- (g) The researcher felt to know the answers of the above questions, the necessity to work upon this area was realized.

III METHODOLOGY

(a) Research Participants- This study carried out in the years 2012-13 in Bhopal city in India. My interest lies in student's belief and behaviour towards integration of history of mathematics with algebra. The unit of sample had students from Science College. The sample was chosen by random sample method.

(b) Method- Keeping in mind the nature of the problem descriptive survey method was suited for the study.

(c) Tool-The tools used were Questionnaire for students. The Questionnaire consists of two sections. Name, gender, Community, category and college name of the student work asked in the section A. Section B of the questionnaire contained 75 statements which are divided into following 11 groups:

- (i) Beliefs about: mathematics as a subject-8 statements
- (ii) Own mathematical abilities- 5 statements
- (iii) Belief Boredom in mathematics-6 statement
- (iv) Factors influence or change the meaning of concepts-8 statements
- (v) Teaching tools in mathematics-5 statements
- (vi) Status of mathematics at graduate level-10 statements
- (vii) Problems faced by the students-6 statements
- (viii) Behaviour of students towards integration of the history of mathematics with algebra? – 10 statements
- (ix) Evaluation of importance of mathematics– 8 statements
- (x) Evaluation of the teacher – 8 statements
- (xi) Mathematics and future scope -2 statements
- (xii) According to the interest the value is given to the statements of the groups, the same are shown below:

Totally agree [Ta] = 5
 Partially agree [Pa] = 4
 Uncertain [U] = 3
 Partially disagree [Pd] = 2
 Totally disagree [Td] = 1

(d) **Hypothesis**- The researcher had relatively no idea regarding the outcomes of this research.

Thus null hypothesis were designed:

H1: There is no significant difference in the behaviour of students towards integration of the history of mathematics with algebra.

H2: There is no significant lacuna between the present curriculum and work done previously in this field.

(e) **Statistical technique**- The statistical techniques have used likely means, percentage, standard deviation and t-test.

IV DATA ANALYSIS AND INTERPRETATION

Out of 580 students included in the study, 543 completed the questionnaire. Thus, the response rate (93.62 %) was very high. In the following table, the statements are taken from the groups. The columns in the table refer respectively: totally agree [Ta], partially agree [Pa], uncertain [U], partially disagree [Pd], and totally disagree [Td].

The following discussion is not only based on above table but on all the data from the questionnaires. Only a small part of data is presented due to limited space. According to the table above and data, generally there seems to be a small tendency towards more positive beliefs about mathematics amongst students from the survey. Student's behaviour tends to be more fundamental and they are more certain in their statements, especially in relation to the usefulness of the mathematics. Most of the students find that mathematics is a difficult subject and they have to work hard and solve many exercises to be good at mathematics. It appears that when the history integrated with the mathematics, own ability of the students improve to learn mathematics.

There is still a close match of agreement that mathematics is boring. This conclusion is rather striking in the situation where 96.7% of students say that mathematics is important. It means that students have a high motivation to learn but for some reasons they are bored in the mathematics lessons. Indeed, the technology that can help teachers to make mathematics lessons more challenging and fascinating has developed enormously during the 18 years (1995 to till now) but the phenomenon of "being bored" in mathematics lessons is still quite common amongst the students.

Some interesting results from our study include:

(i) 89.11% of students agree that mathematics is important and 78.4% acknowledge the usefulness of mathematics in their lives.

(ii) 46.68% claim that mathematics is boring, while 67.32% are sure they need to know mathematics.

(iii) Most students understand that they have to work hard even if they do not enjoy working with mathematics in lessons (72.3%) and it is their responsibility to learn mathematics (88.9%).

(iv) All the students, except one, find it important to know something about numbers and calculations and only two students think it is important to know how to solve practical problems.

(v) There is still a huge emphasis on "mental calculations" amongst the first year students in upper secondary school as 95.8% acknowledge that it is important to become too good at this.

In this study, the behaviour of students towards use of history of mathematics with algebra was to be determined positive. The study is interpreted in terms of percentage.

The data gathered through questionnaire have been analyzed and interpreted from various angles. Mean, standard deviation, t-test and correlation were applied to analyze the collected data. The mean score of student's behaviour towards integration of history of mathematics in mathematics is 315 out of 580. This indicates that students possess only 54.28% positive behaviour towards integration of history of mathematics with algebra, which is very satisfactory/sufficient.

V CONCLUSION AND RECOMMENDATIONS

HOM would stand a greater chance of integration if teachers are better informed about different positions and philosophical trends in mathematics and mathematics education, as well as their own philosophical perspective on the nature of mathematic.

Table 1

S.No	Group	(Ta)	(Pa)	(U)	(Pd)	(Td)
1	Beliefs about: mathematics as a subject-8 statements	67	252	91	59	35
2	Own mathematical abilities-5 statements	37	140	70	85	58
3	Being Boredom in mathematics-6 statements	23	23	38	96	73
4	Factor's influence or change the meaning of concepts-8 statements	14	46	51	152	160
5	Teaching tools in mathematics-5 statements	16	98	67	165	169
6	Status of mathematics at graduate level-10 statements	11	33	48	113	160
7	Problems faced by the students-6 statements	192	103	90	57	35
8	Behaviour of students towards integration of the history of mathematics with algebra? -10 statements	73	98	63	21	60
9	Evaluation of importance of mathematics - 8 statements	189	241	28	18	7
10	Evaluation of the teacher - 8 statements	92	111	48	81	37
11	Mathematics and future scope - 2 statements	145	131	109	79	57

I suggest that when the teachers become in tune with their beliefs and are informed about the ways to reflecting on their practices from philosophical perspective, they might be in a better position to recognize and distinguish the controversies, arguments, and alternatives related to their practices. To consider alternatives, one has to be aware of the alternatives. I assert that raising teachers awareness of philosophical orientations should be one of the major goals of mathematics teacher professional development and should include a study of the evolution of the mathematics concepts and their connections. Currently the predominance of an absolute paradigm within the classroom is host to a multitude of infractions which are interfering with students construction of mathematical knowledge. Students are learning mathematics as isolated facts unrelated within the mathematics curriculum and among various other disciplines. Students are under the impression that mathematics has always existed or was discovered as it is usually presented in today textbooks: clean, factual, algorithm and never devoid of a correct answer. Anything outside of this line of thought prompts the learners to consider they do not possess the "math gene." In my view, there is a significant reason for students to view mathematics as a human creation that began thousands of years ago and is ever changing. Students who view mathematics as a set of discrete, unrelated topics may have difficulty in understanding the relation worth of each mathematical concept, its attachment and value to human life. Raising awareness of critical and timely necessary. Teachers must have a vested interest in the role that learning the HOM plays in students construction of mathematical knowledge and they must become aware of the importance that their own philosophical perspective, on the nature of mathematics, has in accomplishing this goal. In this study the researcher tries to investigate students attitude towards integration of history of mathematics with algebra. It is found that attitude level is satisfactory.

REFERENCES

- [1] Aiken, L.R. (1980). Attitude measurement and research. In D.A. Payne (Ed.), *Recent development in affective measurement* (pp. 1-24). San Francisco: Jossey-Bass.
- [2] Bell, E.T.(1945). *The development of mathematics*, Newyork- London: McGraw-Hill Book Co.
- [3] Cooper, J.B. & McGaugh, J.L.(1970). Attitude and related concepts. In M.Jahhoda & N.
- [4] Warren (Eds.). *Attitudes. Selected readings* (pp.26-31), Harmondsworth, England: Penguin.
- [5] Cajori, Florian (1985). *A history of mathematics*, third edition, New York : Chelsea Pub. Co.
- [6] Furinghetti, F. & Pehkonen, E.(2000). A comparative study of students beliefs concerning their autonomy of doing mathematics *Nordisk Matematikdidaktikk*, 8(4), 7-26.
- [7] Leder, G.C. (1982), *Mathematics achievement and fear of success*. *Journal for Research in Mathematics Education*, Volume 13(2), pp. 124-135.
- [8] Ma,X. and J.XU (2004), *assessing the relationship between attitude towards mathematics and achievement in mathematics: A meta-analysis*. *Journal for Research in Mathematics Education*, Volume 28(1), pp. 26-47.
- [9] Schiefele, U. And M. Csikszentmihalyi (1995), *Motivation and ability as factors in mathematics experience and achievement*. *Journal for research in mathematics education*, Volume 26(2),163-181.
- [10] Subotnic, R.F. (1988), *The motivation to experiment: A study of gifted adolescents attitudes toward scientific research*. *Journal for the Education of the Gifted*, Volume 11, pp. 19-35.