

Teaching Algebra by Using Indigenous Innovative Materials in Class Seven: Bangladesh Context

Md. Abdul Gofur¹

Amirul Islam²

Dr. Md. Abdul Halim³

Abstract

This study has investigated the effect of Indigenous Materials to teach Class Seven Algebra and thorn away mathematics anxiety on mathematics achievement. The purpose of this study was to explore the need of using indigenous materials in Algebra classes. Data was collected from some national representative of Bangladesh. Sample consisting of 44 (out of 50 teachers), curriculum document and class seven textbook document were used to predict mathematics achievement from Indigenous Innovative teaching materials and mathematics anxiety while controlling for demographic differences such as gender, grade, race, and socioeconomic status. The results showed that both mathematics anxiety and Indigenous materials had a significant effect on mathematics achievement. At first, we identified the sample population from the target population. The population of this study was Classroom Teachers, Curriculum Document and Textbook Document. Structured and semi structured questions were used upon the classroom teachers. Curriculum Documents and Textbook Documents were analyzed to find out the effective and assigned way of teaching Algebra by Indigenous Teaching Materials in Bangladesh. This article will help to make Mathematics simple and interesting to the students. It will help to develop Mathematics Teaching-Learning process all over Bangladesh. If all the teachers of Bangladesh will follow the result of this article, it will also remove Math phobia from the students.

Keywords: Indigenous: Local Or Homegrown Materials, **Limitations:** Problems of the study, **Digital Technologies:** Numerical Tools, **Occasionally:** Irregularly

Introduction of the Problem

To measure the effectiveness of Indigenous Materials in Class vii teaching at Jashore District of Bangladesh, we justified the Research Problem from our personal experience by visiting secondary school Algebra classes. There are some literatures which address the support of teaching Algebra by using

¹ Laboratory Assistant, Govt. Teachers' Training College, Jashore

² Professor (Mathematics), School of Education, Bangladesh Open University

³ Director & Professor, Institute of Education & Research, Dhaka University

Md. Abdul Gofur, Amirul Islam & Dr. Md. Abdul Halim

technologies but they did not address the need of indigenous materials. A report from a working group of the Joint Mathematical Council of the United Kingdom Chaired by Professor Rosemond Sutherland & edited by Dr Alison Clark-Wilson, Professor Adrian Old know and Professor Rosemond Sutherland September 2011 (D Monson, E Krupa, K Lesseig, S Casey - 2020).

Digital Technologies and Mathematics Education

In 1963, the UK Joint Mathematical Council was established with a view to promoting mathematical advances and improving teaching of mathematics. It brings together representatives of the societies and organisations involved in the processes and products of mathematics education. Its meetings are attended by academics, professionals and practitioners with a focus on fundamental mathematics, applied mathematics, statistics, operational research, higher education, research and commercial uses of mathematics in addition to representatives from the government departments and agencies including teachers, advisers, inspectors and trainers. In most areas of life, the generic term 'computing' has been replaced by "IT" to describe information technology. In the education context ICT' has been introduced as a term in the national curriculum and one of its core subjects. A focus of information and communication technologies in schools has been on the use of generic software, for instance word processors, spreadsheet or presentational tool with tools that can be applied to online communications like e-mail and Internet (Taylor & Francis, 2019).

Statement of the Problem

Mathematics is compulsory subject in secondary level. Most of the teachers use to teach Mathematics specially Algebra by using Textbook sometimes they use technology. Throughout this report we wish, the mathematics teachers decide that only technology is not sufficient for clear understanding of Mathematics such as Algebra. Obviously, they will change their mind and have a decision to identify proper indigenous materials and use those in their classroom teaching. We strongly said that it makes the lesson simple and interesting. All the classroom changes into a joyful place. If Teachers to teach Algebra in class seven by using indigenous materials, then life-oriented problem-solving ideas and skills should be developed. Which are main objectives of Education Act-2010 in Bangladesh? The mathematicians are working to address important real issues of their time, which in turn require both the development of this area and tools for its support. A few examples of computational tools that have been fundamental to the development of digital technologies to support mathematical development are Pascal and Leibniz's mechanical calculator, Napier's logarithms, Babbage's differential engine,

Newman's Colossus and Turing's Bombe for crypto analysis at Bletchley Park. In this respect mathematics has always been a dynamic problem-solving activity for practical life. We would like to see people continue developing and using new indigenous tools for the next generation. The purpose of this study will be to assess whether or not there is a need for the use of indigenous materials in Algebra classes (The 26th Asia-Pacific International Seminar on Education for Individuals with Special Needs, 2006).

Operational Definition of the Study

The 10 schools were our beneficiaries group. When we went to those schools, we observed their teaching approach was as usual as history, religion and other theory classes. As far as we know, there are many researches in Mathematics, but there is no research about teaching Algebra with indigenous materials. Then we decided to start this research. We hope this will help a lot of teachers and students of Mathematics.

Delimitations of the Study:

1. The source of data is available but limitation of the study is selection of respondents (Head teachers, Mathematics teachers and students) for the study.
2. Financial support is one of the scopes to continue the study but time constraint is one of the limitations.
3. Educational institution selection process is another limitation.
4. The scope of the study is limited to only different administrative divisions (school, madrasa etc.) in Bangladesh.
5. The convenient samples will create limit to the generalizability of finding. So this should be use cautiously because it does not properly reflect the target population.
6. One school among 10 didn't support our cordially to collection data.

Literature Review

We should now examine what the literature says about this subject after we've established our topic. If it's some sort of technical report, we would like to put a theory in here about our approach. There is plenty of advice on report writing including books such as Houpp (2006) and Lewis (1994), and web pages (Lough borough University Library, 2006). As a list of references below, our citations should appear. We used the Harvard Citation style on "Lough Borough University Library" 2006 for this report. Teaching technique of Algebra will increase. Indigenous materials make the student joyful and interesting. Science Student will increase if teachers teach Algebra by using indigenous materials.

Md. Abdul Gofur, Amirul Islam & Dr. Md. Abdul Halim

Drawing provides an essential tool for the understanding and interpretation of geometrical patterns as well as awareness of their interconnections. I'm talking about geometry and an actual world. One of the fundamental principles for teaching geometry is drawing, sketching and using geometrical instruments, according to Wilson (1977). In addition, he argues that a scale drawing process is an appropriate way of producing mathematical models accessible to all learners. It also includes a broad range of practical situations such as building plans, drawing maps and others. Geometry, on the other hand, is perceived by many students as a collection of random assertions in an unorganized way (Sarli 2015). The learners had been using scale drawing to draw and construct models of double decker buildings for the project entrusted to them during this specific study, which is described here. Before construction and drawing, this skill was not taught to them.

B Wane-2023 - academia.edu... search terms were used: Indigenous materials to teach students for Mathematics learning outcomes, instructional strategies, culturally relevant teaching way we teach mathematics by Indigenous materials. (Mather, M., & Knight, M. (2005).

Methodology of the Study

Methodology

Considering the analysis tools excel chart has been used for data inputting, recoding and coding. Regarding the data representation, summarization and analysis the frequency distribution and measure of central tendency have been used. (Taylor, P.C. and Medina, M. 2011).

Participants: At first, we selected 10 school teachers judgmentally to observe Algebra teaching and in-depth interview with them. We identified target population of 10 secondary school teachers. The target population number from selected 10 schools is 50. At first, we made 50 schools serial from 1 to 50. We used sampling calculator to calculate the sample population. We got 44 sample populations from 50 target populations by using sampling calculator. We collected data from the selected

- 44 sample population (School Teacher)
- National Curriculum Document-2012
- Textbook Document of class seven,

(Clements, M. A., & Ellerton, N. F. (2006).

Materials or Apparatus: A structured & semi structured Questionnaire was used for the mathematics teachers and a structured question was used upon the students of selected 10 schools. We collected their answers and analyzed.

The design of this research study was in the sense that it dealt both qualitatively and quantitatively with content analysis and descriptive statistics;

Careful consideration is given to the characteristics of an action research approach. A research design was systematic, observed in an educational setting, focused on the researchers' teaching, and relevant practical. The researcher was conducted the study with following the questions:

1. What are the scopes of using indigenous materials in class VII Curriculum?
2. How do teachers use indigenous materials in classroom teaching?
3. Why teachers do not use indigenous materials in Algebra classes?

The questions demand that this was a quantitative and qualitative research and non-probability sampling techniques were suitable.

Procedure: Mathematics curriculum document and text book was analyzed by us. We identified (both curriculum and textbook) where there were many scopes to use indigenous materials to teach Algebra in class seven. In this research numeric data and text messages and images will be used, so research design is logical to adopt mixed method approach. It is a Sequential Explanatory Design (EB Ryan, H Giles, G Bartolucci, K Henwood, 1986).

Data Collection

Mathematics teachers of 10 secondary schools were the sources data in Jashore area. At first we selected 50 Math teachers of these 10 schools. Then we used sampling calculator for identify sample. Sample calculator selected 44 teachers unbiasedly. We used 14 structured questions and 5 semi structured questions used upon the sample teachers.

Findings and Discussion

Data Analysis

Structured and Semi-structured interviews were conducted with 44 teachers among 50 teachers, selected from 10 different secondary level institutions. It aims at identifying what and how the research sector works, as well as to support a wide range of responses and more detailed explanations. As a means of allowing an interviewer to investigate for additional information and expand on unknown causes, the sequential method was selected. And in the case of 44 mathematics teachers, they used 14 structured questions.

In order to identify common themes among teachers' descriptions and explanations of their preferences in the area of algebra, all interviews have been thoroughly analysed. These responses were grouped in the same way. The participants were given an overview of the purpose and target of the study before it began. It was explained and teachers were given permission to take part in the study by way of voluntary participation and withdrawal from the course at least partially or entirely. Information on the storage and use of data, as well as different means for disseminating research findings have also been made available

Md. Abdul Gofur, Amirul Islam & Dr. Md. Abdul Halim

to participants. At all times, the researchers did their best not to make participants feel uncomfortable or stressed out due to their participation in this study.

Findings of Research

Experiment, observation, systematic well-organized knowledge and the way of this acquired knowledge are called science. Though Mathematics is the key to all science so far learning Mathematics there is no alternative way of experiment in Math class; practical class as well as in theory class. In this regard some experiments are included in secondary Math book. So that students can learn Math practically, develop scientific skill, have clear scientific concept to the related topic. But most of the schools there is no equipment. Only two schools have some of those. But they usually don't use them due to lack of experience about teaching Math. Students cannot touch expensive apparatus although a few teachers demonstrate them. Even most of the Math teachers think experiment is related with practical class in 9 & 10 grade. As a result, there is no difference between Math teaching and history teaching. So Math class is not enjoyable and it is fully rote learning based. As a result, students' science interest is decreasing day by day and the number of science students is decreasing at higher education. The main component is the phobia of Mathematics. So teacher should make teaching aids by indigenous materials and teach them practically. It will help to increase Science students in Secondary level. But the experiments, which have been set in Math in 8 grades can be displayed in class room (theory class) with Indigenous materials and students will learn Math practically. The Math teachers will be able to teach practically if they are trained how to develop Indigenous materials and use them.

Discussion

The result was strongly consistent with our hypothesis. The result of our article supported our prediction. Because all the teachers strongly agree with our statement. Our research indicates that if all the teachers teach Algebra by using indigenous materials in class seven Mathematics classes will turn into an enjoyable place. Math phobia will remove from all the students of Bangladesh. The trend of reading science among students will increase. They will be able to use this idea in their practical field. Mathematics will not be confined to books only, its field will expand further (W Edwards, 1954).

Implication

The outcome of our study leads us to believe that regular practice of teaching math by using Indigenous materials will help to increase the teachers' experience of teachings. As a result, the back-dated concept of teaching Algebra will be updated, their confidence will increase and attitude toward using indigenous materials will be developed. This means, as teachers, that we will have to come up with ways of using indigenous learning materials in 7th grade.

Finally, our last idea to further this study in our training is that we plan to focus on teachers drawing to help organize thoughts. This strategy does not require concrete objects, making it more time efficient but still has the desired outcome. A further training strategy will also be useful for teachers who are creative thinkers, as well as those struggling in the classroom. When marking math answer scripts, this practice will help them organize and separate information.

Conclusion

It depends on mathematics for every area of science and part of today's business. Because of the rapid development of computer technology, this reliance will continue to grow day by day. There is, of course, a need for new ideas and applications to be applied to the teaching of mathematics at this level. They have already been done in many developed and under developed countries. It has made it easier to bring about this radical change, thanks to advances in mathematics education over the last few decades. The educational value of mathematics is known to all not only because of meeting the demand of day-to-day professional life or to excel in different branches of science but also to develop the human qualities. The characteristics of mathematics assist learners in seeking out those qualities such as logical clarity, firm expression and problem solving ability. In the light of these facts, it is appropriate to make some changes in terms of our math education. Teacher must be teach Mathematics by using materials especially indigenous materials. As a result, the students will be getting more interest on Mathematics as well as science subject.

References

- Clements, M. A., & Ellerton, N. F. (2006). Improving prospective mathematics teachers' understanding of the solution process for quadratic equations in the form $(x-a)(x-b)=0$. In H. S. Dhindsa, I. P. Cheong, I. J. Kyeleve, O. Chukwu, & J. S. H. Quintus Perera (Eds.), *Shaping the Future of Science, Mathematics and Technical Education* (pp. 287–296). Gadong, Brunei Darussalam: Universiti Brunei Darussalam
- Creswell, J. W (2007), *educational Research, planning,*, London: prentice hall.
- Comparative Study (1996). Comparison between the Mathematics Syllabuses of 1975 and 1995 in Bangladesh.
- D Monson, E Krupa, K Lesseig, S Casey (2020): Mathematics Teacher Education, – Springer S Crespo, N Sinclair *Journal of Mathematics Teacher Education* 11 (5), 395-415).

- EB Ryan, H Giles, G Bartolucci, K Henwood (1986) - Language & Communication, Elsevier... Share. Export. Advanced. Elsevier. Language & Communication. Volume 6, Issues 1–2, 1986, Pages 1-24. Language & Communication. Psycholinguistic and social **psychological** components of communication by and **with** the **elderly**. Author links open overlay panelEllenB.Ryan
- Education for All (2000). Assessment, Bangladesh country Report.
- Houp (2006). Educational Research and Planning, London: prentice hall.
- Lewis (1994). The co-development of mathematical concepts and the practice of defining. *Journal for Research in Mathematics Education*, 46(4): 46(4): 8-12.
- Mather, M., & Knight, M. (2005). Goal-directed memory: The role of cognitive control in older adults' emotional memory. *Psychology and Aging*, 20(4), 554–570. <https://doi.org/10.1037/0882-7974.20.4.554>.
- Sarli (2015). Incorporating GeoGebra into Geometry learning - A lesson from India. *Eurasia Journal of Mathematics, Science and Technology Education*, 11(1): 77-86.
- Taylor & Francis (2019). B Zelizer - **Digital** journalism, *Journal of International Development and Cooperation* 15(1 • 2), 205-212, 2009).
- Taylor, P.C. and Medina, M. (2011). *Educational research paradigms: From positivism to pluralism*. *College Research Journal*, 1 (1). pp. 1-16.
- The 26th Asia-Pacific International Seminar on Education for Individuals with Special Needs (2006). The National Institute of Special Education (NISE) Yokohama City, Japan December 4 – 7, 2006
- W Edwards - **Psychological** bulletin, (1954) - psycnet.apa.org... Amer. **Psychologist**, 1953, 8, 345. (Abstract); Edwards, W. (1954) ... Toward a statistical theory of learning *Psychological Review*, 57(2), 94-107 ... Studies in decision. II. An empirical test of a quantitative theory of decision. *Journal of Experimental Psychology*, 32(5), 411–423.
- Wilson WW (1977). *The Mathematics curriculum* London, UK: Blackie and Son Ltd.