Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 5, May : 2024

"ROTE METHOD" IN MATHEMATICS 'TEACHING - LEARNING PROCESS'

KAMALA PRIYADARSHINI K. Lecturer, Department of Mathematics,
Rajiv Gandhi University of Knowledge Technologies Nuzvid,
NUZVID, Eluru District, Andhra Pradesh

Abstract

Rote learning is the memorization of information based on repetition. Examples of rote learning include memorizing the alphabet, numbers, and multiplication tables. Some consider rote learning to be a necessary step in learning certain subjects. Memorization isn't the most effective way to learn, but it's a method many students and teachers still use. A common rote learning technique is preparing quickly for a test, also known as cramming. This paper aim to study the impact of Rote method in Mathematics Teaching-Learning process.

Key Words: Impact, Learning, Mathematics, Process, Rote Method, Student

Introduction

Rote learning may be conceived as a cultural phenomenon, as well as a pedagogical problem. Like other social institutions, it seems to have had a natural history. As a problem, it is acute where the tradition of the folk school has not yet been superseded by more sophisticated methods of education. The Negro rural school has certain advantages as place for an educational experiment. In the educational process news, as distinguished from other more scientific and accredited forms of knowledge, has a distinctive pedagogical value.

Advantages of Rote Learning

There are some benefits of Rote Learning, including:

1. Ability to quickly recall basic facts
2. Helps develop foundational knowledge

Disadvantages of Rote Learning

The drawbacks of learning by memorization include:

1. Can be repetitive
2. Easy to lose focus
3. Doesn't allow for a deeper understanding of a subject
4. Doesn't encourage the use of social skills
5. No connection between new and previous knowledge
6. May result in wrong impression or understanding a concept

The most important thing for children to learn in mathematics in the primary years is how to learn mathematics. The biggest problem is that in learning this subject, individuals can develop rote learning mind set. In essence this means that the children have stopped trying to make sense of what they are taught or asked to do in mathematics; they just sit there waiting for the teacher to tell them what to do with a particular type of question. They no longer want to understand. They see learning mathematics as a matter of learning a whole collection of routines and recipes for different kinds of questions. Sadly, they may even have learnt that to get the teacher's approval and the marks in mathematics tests you do not actually have to understand what is going on, you just have to remember the right procedures. If children, learn this in primary schools, then they have not learnt how to learn mathematics. The biggest challenge in teaching mathematics to primary school children is to ensure that they are committed to learning with a meaningful learning mindset. This means that they are committed to learning with understanding. They have learnt how to learn with understanding, they expect to understand and will not be content until they do. They have had teachers who have valued children showing understanding more highly than just the accurate reproduction of learnt procedures (Haylock, 2010).

There is great deal of difference between rote learning and meaningful learning. Rote learning is the memorization of facts or knowledge without context or perspective. This type of knowledge is quickly recalled, but not usable with the other facts to draw conclusions or make inferences when considered in a different framework. Rote Learning is frequently accomplished by memorization and repeated recitation. For example, multiplication tables are learned by rote. Rote learning is a necessary technique when learning basic facts, such as anatomy and physiology, basic assessments and data. However, in order to be a successful healthcare provider, meaningful learning and critical thinking must also be employed (Novak & Canas, 2008).

A set of phenomenographic categories represents a collective awareness rather than an individual awareness expressed by Marton and Booth as a description on the collective level, and in that sense individual voices are not heard‖ (Martonand Booth, 1997, p.114). Thus, in phenomenography, individuals are seen as the bearers of fragments (Martonand Booth,1997, p.114) of differing ways of experiencing a phenomenon. In contrast to the stripped categories of description of memorising in learning science presented in our earlier paper we now take a deeper look at the views held by three mathematicians, whose conceptions were included in and contributed to the construction of the three major categories outlined above.

University teachers earlier experiences of teaching and their perceptions of the teaching context have been shown to be significant dimensions of their current teaching approaches (Prosser & Trigwell, 1999). Moreover, there are relationships between the way teachers approach their teaching and students approach their learning (Trigwell, Prosser & Waterhouse, 1999). Our framework brings to the foreground mathematicians experiences both as learnersand teachers of mathematics. We concur with Akerland (2004) that a focus on academics experience of teaching separated from their larger experience of being a teacher may encourage over simplification of the phenomenon of university teaching, in particular in terms of academics underlying intentions when teaching.

Our theoretical framework draws on and amplifies Burton‘s theories on coming to know mathematics‖ (Burton, 2001, 2003). Burton (2003, p. 13) proposes that coming to know mathematics is a product of people and societies‖ and is heterogeneous, connected with experiences and with aesthetic and other feelings, and interdependent on networks of practice. We conjecture that mathematicians experiences of coming to know mathematics at university are important to how they view the process of learning mathematics and that their beliefs and ideas impact on teaching. Hence mathematicians experiences of memorising in their own learning of mathematics and their perceptions of the role of memorising in their students learning are important to pedagogy. These are areas in which there is a dearth of data. Further, Burton (2001) proposes that mathematicians at university have considerable impact on the continuing development of the discipline and the enculturation of the next generation of mathematicians and mathematics educators.

Mathematicians in universities have great power to influence what is learned and how it is learned in the discipline. They do this, in part, through the respect which society accords their discipline and consequently those within it but these mathematicians are also responsible for teaching the next generation of teachers and, consequently, for contributing to the definition and history of the practices which are seen to be appropriate to the communities that they touch (Burton,2001,pp.589-590). In reflecting about their own mathematical learning, the mathematicians expressed their engagement with mathematics at a high level. They were mathematically curious and wanted to see how everything fitted together with a focus on developing a personal understanding. For them learning mathematics was effortful. All agreed that it was vital to have a memory bank of precise definitions and mathematical concepts and techniques that could be recognised and retrieved as required. This enabled progress to be made in learning mathematics. Their learning strategies included rewriting lecture notes according to their understanding, solving problems, a line by line analysis of mathematical statements and, for some, memorising. Memorising was employed to learn patterns and proofs, for precision and to facilitate progress, for speed in examinations, for permanency and to enable application.

In discussing their students learning, all our participants identified a large group of students whose learning was characterised by imitation. Students in this group were perceived as learning mathematics by rote without an underlying basis of conceptual understanding. For these students the primary goal in learning mathematics was to pass assessments and the mathematicians considered these students to be the weaker students or the students who were struggling.

The mathematicians also identified a smaller group of students, described as the good, advanced or top students, who were motivated by understanding the mathematics and who worked at learning mathematics. Not all our participants perceived that memorising was a strategy used in learning mathematics by these students. The mathematicians who believed that memorizing was used, and was an appropriate and valuable strategy for good students, perceived the purpose and quality of their memorising to be quite different to memorising as the empty repetition and imitation of the weaker majority.

The observations of the mathematicians about memorising in their students‘ learning appeared to be related to perceptions of memorizing in their own learning as students. Moreover, there was little acknowledgement by our participants about the impact of their own learning experiences on their teaching. If personal experiences of learning mathematics are not recognised as being related to teaching mathematics at university we can expect to perpetuate the idea that mathematics is a pure body of knowledge that is learned through logic and rational thought alone, independent of social context, emotion, personal history and human interaction.

The case studies demonstrated little appreciation or nurturing of diversity in learning mathematics and the contributions of students life experiences did not appear to be acknowledged in the mathematicians reports. Burton (2001) distinguishes between mathematical knowledge and mathematical knowing‘ and concludes that while the journey of coming to know is seen as important for research in mathematics it is notably absent from views of teaching mathematics at university. All three participants of our study talked about good students and weak students and their concepts of these appear to be in terms of acquiring knowledge or making an effort to acquire knowledge. A good student is one who works to gain the knowledge set out by the teacher - a poor student does not try or does not succeed in attaining this discipline knowledge. Students engagement with learning mathematics on entering university was systematically undermined during their undergraduate years. The impact of context is important to understanding memorising in learning mathematics and we are investigating this further (Gordon & Nicholas).

Conclusion

Anecdotally mathematicians appear to expect students to know and remember the mathematics they are taught, to have a body of mathematical knowledge in their memories. Our data provides insights into the relationship between memorising and memory and suggests that it is not a simple connection. More research is needed to explicate the strategy and outcomes of memorising in learning mathematics. Questions also arise as to the intentions of mathematics teachers at university is the primary goal that students acquire a body of knowledge, whether by memorising or other learning strategies or do we focus on promoting mathematics enquiry (Burton, 2003) and diverse ways of learning mathematics. The rhetoric of mathematics education emphasises the importance of engaging students to construct mathematics and appreciate mathematical thinking but in our universities the rhetoric and the reality may not match.

References

1. Akerlind, G. (2004). A new dimension to understanding university teaching. *Teaching in Higher Education*, 9 (3), 363-375.
2. Burton, L. (2001). Research mathematicians as learners and what mathematics education can learn from them. *British Educational Research Journal*, 27 (5), 589-599.
3. Burton, L.(2003).*Mathematicians as enquirers*. London: Kluver Academic Publishers.
4. Cooper,I., Frommer, M.,Gordon,S.,Nicholas,J.(2002). University teachers conceptions of memorising in learning science. *Higher Education Research & Development*, 21 (3), 305-321.
5. Gordon, S. & Nicholas, J. (In preparation). Memorising, learning and teaching mathematics at university.
6. Prosser, M.& Trigwell, K.(1999)*Understanding learning and teaching*. Buckingham: Open University Press.
7. Trigwell, K., Prosser, M. & Waterhouse, F. (1999). Relations between teachers approaches to teaching and students approaches to learning. *Higher Education*, 37, 57–70.