

Chapter 2:

Review of Related Literature



Several reports suggest that after lots of intervention and investment the scenario in elementary schools of India is highly concerned. *The Times of India* a national daily has published and reported that 'Right to education' may have ensured more children are now enrolled in schools and fewer students are dropping out, but a majority of those who pass out of Class VIII cannot do basic maths. A quarter of them cannot even read. The Annual Status of Education Report (ASER) 2018, by NGO Pratham, found there has been little improvement in learning over the past few years. Sample this: 56% of students in Class VIII cannot divide a 3-digit number with a single-digit one; 72% students in Class V cannot do division at all and 70% of Class III student are not able to do any subtraction. About 56% of Class-8th students cannot do basic mathematics and 27% cannot read. It is a major issue in the Indian Education System and becomes matter of higher concern.

An article published in scroll.in reported that Some 90% of the children got the calculations for the transactions right in their first attempt and on their own. And nearly all of them got the answers right after being given a chance to correct mistakes, without the help of pen or paper. But when 117 of them participated in a written test, their performance dipped dramatically. They struggled with the addition, subtraction, multiplication, and division that they had used effortlessly in the market transactions, or "street mathematics", when these were presented as "school arithmetic" – abstract numbers without any context and with only a set of rules or algorithms to solve them. Here, their performance matched the findings of large-scale learning assessments such as the Annual Status of Education Report. The annual survey has consistently reported low achievement in mathematics.



Business Standard a national daily has published that Just 27.9% of grade V children can solve a division problem, showing little improvement over a 10-year period. Meanwhile, no more than half of grade V children are able to read a text appropriate for grade II level students, down from 56.2% in 2008. While these attainment figures have been climbing since 2012, they remain low and suggest over 70% of grade V children have not yet attained the foundational maths skills children are expected to grasp after the first three years of education, meaning the majority of students are not 'ready' for the grade in which they have been placed.

The evidence for the support of aforementioned facts is the National Achievement Survey (NAS) Reports by NCERT and The ASER Reports by NGO Pratham.

Investigating in more depth it is observed that solving a new problem is easier to be done when the procedure refers to a successful problem solving (Wareham et al., 2011). Competitive and cooperative learning style as a learning strategy is very important to enhance the ability to solve mathematic problems (Özgen, 2012). Creativity is needed not only when learning in class, but also when solving problems.

The use of APOS theory as a framework revealed that several students' errors might be caused by over-generalisation of mathematical rules and properties (Siyepu, 2013). Difficulties in applying mathematical rules are caused by the inaccuracy of mental structure on the process, object, and scheme level (Maharaj, 2013). Students show low ability of solving problems in the stages of problem modelling process and applying mathematical procedure (Wijaya et al., 2014). Student who has creative idea in solving a problem is not necessarily correct in writing the problem



solving systematics. The students' lack of creativity is affected by many factors, such as the mastery level of mathematic concept, the accuracy in using symbols, the confidence (Karwowski, 2009), and the openness towards an idea. Students who can solve routine problems show their level of ability only on one level, which means that although they can solve a problem correctly, they are still lacking in conceptual understanding (Brijlall and Ndlovu, 2013). Errors in solving mathematic problems are usually influenced by the previous learning habit that is by memorizing (Siyepu, 2015). According to the previous research, errors in solving mathematic problems happen in the mathematic problem modelling process stage (transformation) and in applying mathematic procedure (process skill). But that research ignore the errors in solving mathematic problem on the encoding stage. However, Newman in White (2009; 2010) defined five main abilities of literacy and numeracy, i.e., reading, comprehension, transformation, process skills, and encoding.

