

Shirani Kochar

151151

B. Ed. Ed - III year

Digantar Report Learning of Mathematics in Digantar Classrooms

This report is based on a visit to Digantar schools in Jaipur where, through non-participant observation the data was collected. The following are the points that look into various practices and teaching methods used in mathematics classroom, in light of various theories learnt.

* Different levels: Unlike traditional classrooms, where there are classes according to the age, the Digantar classrooms had children working at different levels of mathematics. For eg.:- The students were divided into two groups, one working on '6-8 अंतर' and the other on '9-12 अंतर'. These groups weren't dependent on the time period. Any student who has understood the

concept, could move to another level. It is believed that every child has ~~used~~ their own pace of learning, and they have different learning requirements. Keeping this in mind, the Mathematics classes take place.

* Focus on child's thinking process:

The teacher in the class always tries to know how the child reached to a particular answer. For this, s/he would ask questions like "मे कैसे किया?", " $5 \times 2 = 10$ क्यों है, पता है ना?", etc.

Apart from that, the teacher used to check the notebooks daily and discuss the work individually by asking them how they arrived to a particular answer. In NCF 2005 too, one of the main goals of mathematics education is the "mathematisation of the child's thought processes".

Moreover, Constance Kamii ~~lays~~ lays emphasis on the process of thinking, i.e., an important objective in Math, and

not the production of correctly written answers.

- * Focus on the conceptual knowledge :
 With the focus on child's thinking process, it is clearly understood that the procedural knowledge is used to develop the conceptual knowledge. According to Piaget, such knowledge which deals with underlying idea of concept and relationships between objects, is called logico-mathematical knowledge.

For eg.- While teaching multiplication, ~~the teacher~~ through the concept of "Bill-making", the teacher explained the concept behind it, (pg-5 of raw data)

$$45 \times 4 \text{ was explained as } 45 + 45 + 45 + 45 \quad (45) \quad (45) \quad (45) \quad (45)$$

$$= 180 \quad [\text{Repeated Addition}]$$

- * The teacher also used different ways of representation to explain a concept rather than just telling the algorithm. [The teacher also used multiplication cards, but only after

the concept of multiplication was clear to the child].

- * Peer interaction: Importance was given to the peer interaction apart from the individual attention given by the teacher. The student was given enough freedom to ask their peers in case they needed help. According to Vygotsky, much important learning by the child occurs through social interaction (peers in the classroom). And many times, more knowledgeable other is not just a teacher or an older adult, but a child's peer can help who has a better understanding of the concept. With children at different levels in Maths, this makes possible the peer interaction effective.

- * Vygotsky gives importance to the social context of the child. For this, words to teach Maths were used from the social context of the child. Instead of using mathematical jargons for addition

and subtraction, words like निकलना, मिलना, etc. were used.

- * Use of concrete materials: A lot of material was used by the children and the teachers, like use of stones, twigs and, multiplication and arrow cards.

Leah suggested that the materials can be effectively used as an intermediary between real world and the mathematical world. Therefore, when the students start counting or adding and subtracting, stones are used by the children to help them understand it better.

Piaget too, laid emphasis on the hands-on experience with the material in learning of a concept. Moreover, Bruner and Dienes, both gave importance to the use of materials for active involvement of the child in understanding the concept.

- * The mathematical concepts taught, move in hierarchy. The teacher teaches the new concept only after revising the previous concepts.

(like teaching division after revising subtraction, multiplication). Rohit Shankar talks about the hierarchical nature of mathematical concepts.

* The students while learning about the concept of Time and how to calculate it, first understood about the hands of the clock and practiced single-digit numbers, then double-digit numbers and then moved to adding of time and the calculation of the same. Hence, the learning and teaching moves from simple to complex. (pg-20 of raw data).

* Bruner talks about enactive, iconic and symbolic stage. The use of stones for counting shows the child in enactive stage. When types and tokens are used to understand the place value, iconic stage of a child is seen. Symbolic stage is when the child uses symbols and algorithms. Hence, at Digantar, students are exposed to all the three representatives.

* Lesh extended Bruner's theory and talked about interdependence of different modes of learning which include pictures, manipulative aids, written symbols, spoken symbols, and real world.

For eg. - Children were given some real life situations to solve a mathematical problem. Spoken symbols like $\frac{4}{5}$ and $\frac{3}{5}$ were also used. Children moved between these modes of learning. Like one child couldn't understand it through symbols, so the child used stones instead.

*

NCF 2005 - "Equating mathematics with formulae and mechanical procedures does great harm." Rigorous schools however create an environment of understanding the concept, rather than rote learning of algorithms and testing the memory through examinations.