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Teaching of Mathematics in Internship Period of B Ed Students: A Case Study

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Abstract

Teacher education system is an important vehicle to improve the quality of school education. Internship is the main focal period for B.Ed students. It is the time to innovate new practices of educating teachers for internship. The intent of this study was to investigate the influence of an Activity Based Mathematics Teaching in promoting innovation. In this study the researcher observed activity based method of teaching mathematics which was practiced on the B.Ed students of MJPR University, Bareilly in India. In this research paper, the author has developed a model of implementing activity methods of teaching mathematics considering the qualitative and quantitative results.

Key words: Activity based method, Mathematics, Pre-service teacher

Introduction

Teacher education system is an important vehicle to improve the quality of school education. The revitalization and strengthening of teacher education system is therefore a powerful means for the upliftment of education standards in the country. It can make the teachers professionally competent and inculcate necessary pedagogical skills to meet the demands of the society. The National Curriculum Framework for Teacher Education (2009) presented the following vision of teacher and teacher education:

- Teachers need to be prepared to care for children, enjoy to be with them, seek knowledge, own responsibility towards society and work to build a better world, develop sensitivity to the problems of the learners, commitment to justice and zeal for social reconstruction.
- Teachers need to view learners as active participants in their own learning and not as mere recipients of knowledge; need to encourage their capacity to construct knowledge; ensure that learning shifts away from rote methods. Learning is to be viewed as a search for meaning out of personal experiences and knowledge generation as a continuously evolving process of reflective learning.

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- Teacher education must engage with theory along with field experiences to help trainees to view knowledge not as external to the learner but as something that is actively constructed during learning. Teacher education should integrate academic knowledge and professional learning into a meaningful whole.
- Teachers need to be trained in organizing learner-centred, activity based, participatory learning experiences – play, projects, discussion, dialogue, observation, visits, integrating academic learning with productive work.
- Teacher education should engage teachers with the curriculum, syllabi and textbooks to critically examine them rather than taking them as'given' and accepted without question.
- Teacher education should provide opportunity to student-teachers for reflection and independent study without packing the training schedule with teacher-directed activities alone.
- The programme should engage teachers with children in real context rather than teach them about children through theories alone. It should help them understand the psycho-social attributes and needs of learners, their special abilities and characteristics, their preferred mode of cognition, motivation and learning resulting from home and community socialization.
- The programme should help teachers or potential teachers to develop social sensitivity and consciousness and finer human sensibilities.
- Teacher education programmes need to broaden the curriculum (both school and teacher education) to include different traditions of knowledge; educate teachers to connect school knowledge with community knowledge and life outside the school.
- Teacher education programmes need to help teachers appreciate the potential of hands-on experience as a pedagogic medium both inside and outside the classroom; and work as integral to the process of education.
- Teachers need to re-conceptualize citizenship education in terms of human rights and approaches of critical pedagogy; emphasize environment and its protection, living in harmony within oneself and with natural and social environment; promote peace, democratic way of life, constitutional values of equality, justice, liberty, fraternity and secularism, and caring values.
- In view of the many-sided objectives of teacher education the evaluation protocol needs to be comprehensive and provide due place for the evaluation of attitudes, values,

dispositions, habits and hobbies ,in addition to the conceptual and pedagogical aspects through appropriate quantitative as well as qualitative parameters.

Activity Based Mathematics Teaching in Teacher Education

Activity -Based Learning is an umbrella term that refers to several models at instruction that focuses the responsibility of learning on the learners (Wikipedia, 2008). Activity-based teaching is an approach to education focusing on the idea that students should be engaged through actions. This is in contrast to some traditional forms of teaching in which an educator lectures or otherwise relays information to students who are expected to absorb what they are told. In activity-based teaching, an educator serves the function of facilitator, assisting students through the learning process and providing them with guidance. Various actions and tasks can be used in this type of program, allowing students to become directly involved in the learning process, rather than remaining passive. The purpose of activity-based teaching is for an educator to engage students directly, drawing them into a lesson so that they become a participant in their own learning. Some traditional forms of education often relied upon the educator as a knowledgeable expert who simply provided information to students. In this type of environment, the learners were expected to act as sponges that absorbed information, regardless of any particular type of effort made on their behalf. The students were taught, but there was not necessarily a focus upon them being a participant and actively learning while in a classroom

The Study

The intent of this study was to investigate the influence of an Activity based Mathematics teaching in promoting innovation.

Research questions

The questions the study seeks to answer are:

1) What influence did an activity based teaching have on pre-service secondary Mathematics teachers' disposition towards, and utilization of an innovation?

2) What factors influenced student teachers' instructional decisions during their practicum?

Delimitation

The present study was delimited to Vivek College of Education, Bijnor District affiliated to M.J.P.R University, Bareilly in India.

Activity Based Mathematics Teaching (ABMT)

Despite its theoretical appeal, ABMT has not been widely utilized in Mathematics Teaching. As a result, it is unlikely that student teachers would be familiar with the approach prior to

entering into the B.Ed course. This means that ABMT would truly be an innovation for the student teachers participating in the study.

Sample

Data for the study was collected from 18 Pre-service teacher having mathematics method in B.Ed course of the year 2012-13.

Tools and Procedure of Data Collection

Data were collected at three periods of time - the beginning of the course i.e. in the month of July, before the winter vacation i.e. in December and the conclusion of the two week practicum in the month of April during 2012-13. This enabled the researcher to assess the influence of the ABMT and the two week practicum on students' perceptions and utilization of ABMT Quantitative data was collected in the form of the at each of the data collection periods. The Pedagogical opinion Scale (POS) consisted of sixteen statements relating to eight topics such as fraction trigonometry, co ordinate geometry algebraic expression , second degree equation, graphical representation of data, function and relation and set theory . Each topic was represented in the scale with a positive and negative statement and students were asked to express their level of agreement towards each statement using a three point scale. The incorporation of positive and negative statements facilitated the use of the split-half method to assess the inner reliability of each statement pair. The overall rating of the pairs on the scale was 0.82.

Major Findings

Influence of the activity based mathematics teaching

At the beginning of the B.Ed course students generally viewed mathematics teaching as a very difficult task. The role of the teacher was to carefully select and sequence the mathematical concepts introduced and provide opportunities for students to solidify their knowledge about the mathematics teaching through numerous activities. "The activity based method makes classroom management very easy. most students were sceptical about the pedagogical value of ABMT, comets are taken by the researcher and analysed .The comments demonstrate pre-service teachers' perception of mathematics teaching knowledge from concepts introduced by the teacher. The results of the personal inquiry promoted in the class were positive. One student noted that the course had "a particularly catalytic effect." In addition to promoting general professional development, the activity based teaching also prompted a general shift in students' disposition towards the innovation.

Influence of the Practicum

Two case studies were presented which highlight adopting of activity based method of teaching mathematics by the student teachers from utilizing innovative practices.

Case study -1

Experimentation with Shalini

When Shalini started the practicum she was excited about the prospect of experimenting with concepts introduced by the teacher educator. As per her opinion everybody fears to teach mathematics. After being exposed to a variety of new alternatives in her methods of mathematics teaching , Shalini was anxious to adopt this method in her practice teaching.

In the course of practice teaching, Shalini was placed with two mentor teacher Educators – a Physical science teacher educator and a mathematics teacher educator. Her experiences with each of the mentor teacher educators would be very different. Shalini taught 6th class mathematics to verification of right angle triangle

Activity – I- A: Verification of Right angle triangle.

Pre requisite knowledge: Area of circle, circumference of circle

Material required: Pencil, simple paper or notebook paper

Procedure:

Draw a circle and fold it directly in half and crease it well. Open it and hold the circle at the end of the crease and fold the circle in half again but at this time match up the end points of the crease. Again open the circle and fold in one of the outer, curved edges of the circle until it just touches the dot in the middle. Crease it well. Again open it and fold the opposite side of circle and fold it so that the curved part just touches the center and the bottom forms a perfect point and that makes the cone. Fold the top of the cone down until the curved part touches the centre of the circle. The top corners should make perfect points. Crease well and equilateral or acute triangle is formed. Fold new triangle in half by matching up two of the points, crease well. The new crease splits the triangle in half.

Shalini expressed her views that students are interested in this method. But since it is time consuming she could not finish the topic in due course of period, her experiences in the physical science teacher educator , Shalini was given a significant amount of freedom. She opined that: I was alone in the classroom for two weeks with my seventh class the student considered me as the regular teacher." She decided to experiment with an inductive and deductive method with activity approach for teaching mathematics. She provided students the problems and asked them to solve in small groups to identify examples of each case. She felt as though the activity had been well organized; however, the results were not positive. Although she acknowledged that they didn't have the requisite skills to complete the activity, she attributed the failure of the lesson to her inability to control the teaching process.

Case study –II

Chhabi Gerg

Chhabi Gerg was assigned to a mentor teacher. The mentor teacher had

been teaching mathematics for over fifteen years and had established a very deliberate method of instruction. Chhabi Gerg explained: "Everything is the same and she teaches all of her classes, algebra or geometry, the same way. They do the exact same things and so it's very structured." The method she used was analytic, synthetic and activity-based which would then be reinforced and used through the completion of several exercises and worksheets.

Although Chabi enjoyed a very amicable relationship with her mentor teacher, she felt somewhat restricted to the method already established in the class she was teaching.

Activity – II: To find formula for Area and Volume of Cylinder

Pre requisite knowledge: Area of Rectangle, circumference

Material required: simple paper and pencil, scale

Procedure:

Draw a rectangle, Measure the length and breadth of rectangle, Fold it and make the cylinder and then measure the length and breadth of rectangle, i.e. height and circumference.

Area of a Cylinder

You can see that the surface is made up of two circles and a rectangle. The length of the rectangle is the same as the circumference of the circle! Imagine that you can open up a cylinder like so: Area of Cylinder = Area of Rectangle

= length*breadth
= circumference*height
= 2 r*h
= 2 rh

Find the radius and height of the cylinder.
Volume of Cylinder

= Area of the base * height
= Area of circle * height
= r,2* h,= r,2 h

She said "I didn't really feel I had much room to move just because she was so organized and she had everything set out and they had a pattern and all of her students were used to it." The comments of the mentor-teacher were perceived by Chbabi to be a significant impediment to creating her own lessons. The experiences of the two students are indicative of the difficulties experienced by most of the student teachers in the study. Although most of them believed in the value of task-based mathematics teaching and expressed an interest in experimenting with the approach in a practical setting, very little experimentation took place. The structure of the teacher education program made it difficult to translate theory into practice. In university courses students were introduced to a number of theoretical concepts, including activity based mathematics teaching, which they were expected to then utilize in a practical setting. However, a number of the mentor teachers were not familiar with the concepts and, therefore, were not able to

provide support. Furthermore, the instructors who introduced the concepts and could provide assistance were not available for consultation.

Conclusions

Based on the whole study, a model for innovative activity-based instructions for teacher preparation is proposed. It is believed that the adoption of this model by teacher trainers generally and primary mathematics methodology course lecturers in particular in any institution will produce teachers who will be able to deliver not only activity-based mathematics but any other pupil-centred instruction Activity-based Instructional Model (ABIM) is a model with 4 major cyclical phases. These are:

i. Planning stage
ii. Delivery stage
iii. Guided response
iv. Skills formation

The results of this study demonstrate a significant effect on student teachers' disposition towards innovation. Nonetheless, the effect of the method was negligible on student teachers' utilization of the innovation during the practice teaching due to shortage of time. Data reveals the fact that there is a weak or non-existent link between student teachers and teacher educator, as an exercise in professional development rather than skill development. These point to the fact that the teacher education program is unlikely to play a prominent role in the promotion of innovation in teaching of mathematics.

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"If you don't build your dream, someone else will hire you to help them build theirs."

~ Dhirubhai Ambani

"Great minds discuss ideas; average minds discuss events; small minds discuss people."

~ Eleanor Roosevelt