

Critical View on Inquiry Learning in Science Classroom

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Abstract— Science education is one of the most important demands of the current century to excel and promote the level of understanding and behavior of the individual. Teaching and learning of science by inquiry is one of the prime areas of concern in today's realm of science education. This literature provides guidelines with the help of reform documents for promoting inquiry as the central strategy for teaching science. Science education in India, even at its best, develops competence but does not encourage inventiveness and creativity. Inspired by its seemingly frequent use in reform documents, policy paper, guidelines and in textbooks many questions needs to be answered surrounding inquiry. Through this paper general public wants to know from reformers from all categories – teachers, teacher educators, administrator, policy makers and members of various educational committees what answers research has for such questions.

Key words: Inquiry Learning, Science Classroom

I. INTRODUCTION

For the last many decades in India, education has become an enterprise of contradictions and unresolved dichotomies. At National level the overall conceptualization of curriculum of science has steadily matured and is trying to keep a pace with the evolving contemporary trends in science education over the world. In recent years research community has urged teachers to adopt inquiry approach to teaching science, as the community considers that teaching science through inquiry is the most effective approach, as a result of it even the textbooks are written in the format of inquiry till elementary level and somewhat at upper level taking two cartoon characters in pictures “Boojho and Paheli”.

To transform the current science teaching into inquiry based teaching, it is very crucial for science teachers to understand the conception of nature of science (NOS) as a part of being scientifically literate citizen and to know how to conduct inquiry science. Inquiry teaching is one of the central concerns for educational reform. The high standards are set forth in efforts of various national reforms which are non achievable with traditional science instruction. The compatibility factor between the objectives and the priorities of traditional science teaching with national priorities and goals of educational reform is a wide mismatch. It has always been a priority of traditional science teaching in teaching science “a mile wide, an inch deep” (Schmidt, 1997 in Frelindich, 1998), but such an approach can help only high achieving students not the majority of students. A national document such as Science for all Americans stresses on the science education communities to take the responsibility to make to make accessible to broader range of students (Rutherford and Ahlgren, 1990). In present scenario of science education in India this is one of the major issues that stands out mistakably that our science education is still far from achieving the goal of equity mentioned in constitution. Inquiry based science instruction

shows at a same time potential for equity and excellence in science education (NCEE, 2007, Sable, 1997, von Secker and Lissitz, 1999, von Secker, 2002)

A. Inquiry based Learning: Argument On Support Side

It is suggested by various researchers and there are ample of evidences of the effectiveness and usefulness of inquiry based learning which has improved students achievement in various aspects. Kilinc (2007) introduced inquiry based experimental activities on 24 pupils in teaching of photosynthesis from Grade 3 at Ataturk Anatolian High School in Turkey. He used experimental study sheets, opinion survey, and video records of two hour lesson. Kilinc pointed that pupil found the laboratory activities more enjoyable more retentive and pupil centred than the traditional method. He also reported that students were benefitted more from interaction among students and their attitude has increased positively. He also pointed that inquiry based learning has helped students in various other aspect like their ability has increased in applying learning in new situation.

Phoenix (1964) also stated that if one possesses the tool of inquiry, he/she need not to store a large number of accumulated knowledge which gives a firm philosophical foundation for utilizing inquiry based learning for tackling the need of modern life. Kahn and O'Rourke (2004) also maintain a view that inquiry based learning offers a range of abilities and skills for tackling the challenges of modern world. Inquiry based learning have supporters from psychological field also. Inhelder and Piaget (1958) advocated that the process of inquiry helps in developing the capability of a person in moving from egocentric, intuitive and dealing in concrete concepts towards more decentralized, analytical and abstract thinking. In respect of cognitive development they also declared that there is no other mode of mental activity than the process of inquiry where developmental trends are more evident. Inhelder and also denoted that activity of gathering, processing information and assimilating discrepant events is more exciting, pleasurable and intrinsically rewarding. Even motivation theorist has also acknowledged the usefulness and importance of inquiry for children. Kuhn (2007) also mentioned the growing aspect of motivation in interaction between individual and subject matter is very important as motivation does not reside with individual but such interaction is the basis for inquiry based teaching.

B. Inquiry based Learning: Argument On Challenge Side

In the previous section we discussed various philosophical, psychological supporting the inquiry based learning as a strong rationale to implement in the classrooms where as now we will point out views that challenges these rationales. Salvin (2004) raised the argument on the diversity of teaching and learning methods employed under this umbrella term inquiry based learning. Newman et al (2004) also pointed out that in classroom practices it causes the condition of dilemmas for teachers during the study of

inquiry as various definition of inquiry exists in the literature, because of which teachers and educators got confused and struggles deciding how to teach their courses. The situation puzzles them more when teachers frame inquiry in constructive design where reality is constructed socially and by experience. The interpretation of term constructivism is itself multifaceted (Philips, 2000) hence its usefulness and extent are both questioned. Under such confusion a new working definition of inquiry will be constructed by teachers and students depending on those who hold the construction, the constructed entity will have different form and content. (Schwedt, 1997, 2000, von Glasersfeld, 1996)

In the field of psychology, Kirschner et al (2006) criticized inquiry method and pointed out that such method produces cognitive overload and unproductive search in problem solving settings. They argued that any instruction procedure that ignores the cognitive architect is always going to be an ineffective scenario of science education in India this is one of the major issues that stands out mistakably that our science education is still far from achieving the goal of equity mentioned in constitution. Inquiry based science instruction shows at a same time potential for equity and excellence

C. Practicing Inquiry based learning – A Challenge

The research studying teachers found that inquiry based learning puts special requirement on teachers. The various innovative inquiry curriculums creates dilemmas for teachers because in these innovative programmes teacher tries to certain their role in classroom for effectiveness of methods and purpose of their instruction which is actually very uncertain. The translation of material in a more familiar language of classroom is a tough work for teacher and in these translations the important elements are sometime ignored or redefined. When teachers are asked about challenges they face in inquiry classroom the answer that can be heard without a delay of seconds is lack of time, dealing with abstract concepts, turning student's questions back to them. The few significant research have also reported challenges in implementation of wide range of settings and background to promote development of inquiry based science classrooms in contemporary school setting (Kolodner et al, 1998, Hmelo et al, 2000).

Another area of challenge in inquiry based learning is in the assesment of performance of student which is in itself a difficult task experienced by teachers as the activities carried out are very vast, summative in nature and there are not many standardized tool for assessments.

II. CONCLUSION

The results from various researches conducted shows that there is an ambiguity in defining and implementation of inquiry based learning. We pointed out the various arguments related to the strength and effectiveness of inquiry based learning along with its weakness and challenges faced by teachers in its implementation in classroom back by various theories and classroom practice, it seems that the major concern for successful implementation of inquiry based curriculum and the major obstacles teacher face is the difficulties that arise from the pedagogical requirements and the contextual constraints.

The one aspect that cannot be ignored is the teacher's belief, as it is found that teacher's belief always played a crucial role in implementation of any new teaching method. With these arguments and challenges we put a question for all educationist, policy makers, administrators, reformist to find a way out of this problem and suggest a possible solution of this problem through various programmes, as for a quantitative change from present situation, science education in India must undergo a paradigm shift.

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