

**PERCEPTIONS OF PRE SERVICE TEACHERS ABOUT USE OF 5 E
INSTRUCTIONAL MODEL FOR TEACHING ENVIRONMENTAL
EDUCATION**

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Abstract

The study was conducted in the light of the philosophical framework of inquiry-based Environmental education. The aim of the study was to reveal pre-service teachers' perceptions towards the course they participated, which was designed on the basis of inquiry principle. As part of their research based project, pre-service teachers who had opted for environmental education course were asked to develop lesson plans based on environmental topics targeting middle school SSC board students. Qualitative research methodology was used to analyze the collected data in form of open ended questionnaire after the completion of course. Responses provide evidence of the promise of this approach in helping pre service teachers develop the needed skills and content knowledge to create effective and engaging environmental courses for their students.

Keywords: *Environmental Education, Pre-service teachers, Perceptions, Inquiry-based learning*

1. Introduction

In 21st century skill based education there is a need of learner-centred domain knowledge learning. It is well recognised that the inquiry-based learning approach is a useful pedagogy for realising learner-centred learning (Marshall, Smart, & Horton, 2010) Incorporating the inquiry-based learning pedagogy into school system can be a potential method for realising learner-centred educational goals and driving

teachers to apply and reflect on pedagogical designs. In order to achieve the goal of creating inquiry based learning environment classrooms, the teacher education institutes should develop competencies among pre-service teachers. Encouraging pre-service teachers to incorporate inquiry-based teaching in their classrooms will be futile if they lack an understanding of what inquiry-based learning and teaching should look like. This lack of understanding on the part of pre-service teachers will often lead to feeling detached and their inability to create such learning environments. Therefore, it is imperative that pre-service teachers gain firsthand experience and develop a more in-depth understanding of inquiry-based learning as part of their training.

1.2 Teaching Environmental Education through Inquiry based learning

The complex nature of Environmental Education has been a challenge to teachers across schools and university. Simple teaching of known facts did not yield the expected outcome of creating sensitization among students about environmental issues. The inquiry-based approach to Environmental Education is based on a moderate constructivist's view that active engagement with environmental topics in a supportive learning environment helps students to develop a sound base of subject and process knowledge. As pre-service teachers are new to the profession therefore most open to new ideas and methods of teaching. Since newer methods of teaching are most impressionable with pre-service teachers, there is value in the participants' preference for more placement time. So to make it feasible the researcher felt there was need to create problems, case or research scenarios, experiential or laboratory settings that were presented by the pre-service teachers to the students to work on either in groups or autonomously. Though structure of these settings, as well as the level of guidance varied according to the capability of the pre-service teachers. All the pre-service teachers shared the aspect of inquiry as the main theme of the lessons that allowed them to become researchers rather than recipients which in turn created increased interest and motivation in the students. The lesson was based on 5E approach.

2. Conceptual framework

Constructivism is the theoretical framework which drives the importance of this qualitative study. . The constructivist theory gives meaning to learning environments by starting lessons off with identifying with what pupils already are familiar to. Inquiry based learning encourage students to construct knowledge through problem solving and experimentation. The word ‘inquiry’ is often associated with other ones such as ‘hands-on’, ‘problem-based’, ‘project-based’, ‘student-centred’, ‘inductive and dialogic approaches’, as they are all terms closely connected to a common idea of a learners actively engaged in the construction of their own knowledge (Anderson, 2002; Hayes, 2002) Inquiry in education is described as a multifaceted activity that involves making observations posing questions, examining books and other sources of information to see what is already known, planning investigations, reviewing what is already known in light of experimental evidence, using tools to gather, analyse, and interpret data, proposing answers, explanations and predictions and communicating results. Inquiry requires identification of assumptions, use of critical and logical thinking, and consideration of alternative explanations (National Research Council, 2000), as well as constructing models and forming coherent arguments (Linn, Davis, and Bell, 2003). There are different forms of inquiry learning (Bulbul, 2010). In structured inquiry the teacher provides the input for the student with a problem to investigate along with the procedures and materials. This type of inquiry learning is used to teach a specific concept, fact or skill and leads the way to open inquiry where the student formulates his own problem to investigate. The learning cycle model is a teaching procedure consistent with the inquiry nature of science and with the way children naturally learn (Cavallo & Laubach, 2001). Many versions of the learning cycle appear with phases ranging in number from 4E to 5E to 7E. Regardless of the quantity of phases, every learning cycle has at its core the same purpose. In this study, 5E learning cycle instruction model by Bybee et al., (2006) was used which consisted of the following phases: engagement, exploration, explanation, elaboration, and evaluation. Each phase has a specific function and contributes to the teacher’s coherent instruction and to the learners’ formulation of a

better understanding of scientific and technological knowledge, attitudes, and skills. The model frames a sequence and organization of programs, units, and lessons.

3. Methodology

3.1. Purpose of the study

Understanding pre-service teachers' ideas about and experiences with implementing inquiry based teaching is crucial, since these are the teachers that will lead the future facilitation of environmental literacy. So the main goal of the research was to study the perception of pre-service teachers about using an inquiry-based approach for teaching environmental topics. In detail the following research question was verified:

1. What are the perceptions of pre-service teachers about using an inquiry-based approach for teaching environmental topics.

3.2. Procedure

The study was realized as single shot case study with post-test perception questionnaire at the K.J.Somaiya College of Education, Mumbai in the year 2014-15 with 30 pre-service teachers. In this study, the researcher provided pre-service teachers with opportunities to experience inquiry as learners, as well as to be environmental designers. Pre-service teachers worked in pairs, according to individual preferences. Two weeks were allocated for the lesson developments based on 5E. The pre-service teachers were expected to share their lesson plans with their classmates each week and make any necessary changes based on feedback.

4. Data collection and instruments

A questionnaire consisting of three open-ended questions was designed and administered to the pre-service teachers, based on an extensive literature review and opinions from two experts in environmental education. The questionnaire focused on three main themes: Meaning of Inquiry based learning, inquiry learning as strategy for teaching Environmental Education and difficulties in using inquiry learning for Environmental Education concept.

5. Data Analysis

Qualitative research methodology was used during the analysis of pre-service

teachers' responses. Three main themes - identified by the researcher were used to form the basis of the analysis. Responses to the questionnaire were coded and analyzed by two researchers independently, and further themes were identified.

4. Findings

Qualitative results are presented in brief in the following list:

1. Meaning of Inquiry based learning:

Learning by doing: All the pre-service teachers highlighted that the inquiry based learning involves learning by doing.

“Inquiry based learning is learning by doing and to get hands on experience on a certain topic or concept and going into the depth of it.”

Two way approach: Some of pre-service teachers' perceived inquiry based learning as a two way approach where there is equal participation of students and teacher.

“Inquiry based learning is much beyond rote memorization and help the students and the investigator to acquire the skill of problem solving because it's a two way approach where there is equal participation of students and teacher.”

Construction of the knowledge: The pre-service teachers reported that inquiry based learning is basically constructing the knowledge by engaging the students in activities, posing questions, situations and coming up to solutions.

“It is basically constructing the knowledge and much beyond rote memorization. It helps the learner to acquire the skill of problem solving. IBL helps to identify solutions to the concept by engaging the students in activities, posing questions, situations and coming up to solutions.”

2. Inquiry learning as strategy for teaching Environmental Education:

Promotes critical thinking: Most of pre-service teachers felt that inquiry based learning encourages understanding the environmental problems in a better way and also enables students to come up with solutions to solve these problems.

“IBL promotes critical thinking being constructivist approach it helps the student in applying skills and knowledge and find solutions for higher order questions which

deal with applications related to daily life. It is a way to create awareness regarding current issues related to the environment.”

Creates platform for experiential learning: Many of pre-service teachers felt that inquiry based learning provides real life experiences related to environmental issues.

“Inquiry based learning provides students a platform from where students can get a hands on experience and it provides opportunity for the teacher to share, think and get involved with the students. As we all know things which we experience always remain fresh in our memory. So in environmental education students get experience of the real condition of our environment.”

3. Difficulties in using inquiry learning for Environmental Education concept:

Time as factor: Some of pre-service teachers felt it is a time consuming strategy for teaching environmental education.

“It is very difficult for teachers because teachers have to do so many things in a limited period of time,

Prior preparations pressure: Some of pre-service teachers highlighted about the pressure of preparing each lesson in an innovative way so that the students can relate it to their life and become emotionally attached to their environment were biggest challenges.

“ I wonder how many lessons can be dealt with inquiry based learning as it involves a lot of prior preparations and efforts though this is good and useful technique for students. Lastly disciplining the students and maintaining class control is a bit tedious.”

Infrastructure hurdles: Many of pre-service teachers expressed the difficulties which they had to face with respect to space crunch in schools for conducting inquiry based learning lesson for environmental education.

“The difficulties which I envisaged in using inquiry based learning approach was the space. The student found it difficult to discuss the activities with their peers due to the seating arrangement.”

5. Conclusion

This study provided pre-service teachers with their first experience of inquiry based learning both as developers and users. They reported it as a valuable instructional model despite the limitations identified. The results of this study are mainly in line with prior findings and theoretical assumptions.

6. Recommendations

Pre-service teachers need to stay informed about use of different instructional models and how to practice in day to day teaching sessions. This awareness can be provided through integration of different instructional models and its applications into pre-service teacher education courses. The researcher recommends investigating the impact of different instructional models as a teaching tool - on pre-service teachers' future teaching practices in the long term.

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