

DEVELOPING HANDS-ON ACTIVITIES TO AVOID THREATS OF POSSESSING SCIENCE MISCONCEPTIONS AMONG PRIMARY STUDENTS

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Introduction

Science and technological developments throughout the world has brought tremendous development in the global society. In order to live in such a complex society an individual needs to possess a basic understanding of science. The importance of science as a basic requirement in education is explained by Harlen (1985). As she explains "Science is as basic a part of education as innumeracy and literacy: It daily becomes more important as the complexity of technology increases and touches every part of our lives" (p.2). Development of scientific concepts should be started at the very early stage of one's life. According to Jacobson (1970) one of the goals of elementary science is to gain an understanding of the conceptual structures of science. Concept development in science is crucial because concepts need to be developed without allowing students to possess misconceptions. The difficulty arising from constructing misconceptions is indicated by Das (1985, p.135). According to him "Once a concept is wrongly conceived, it is very difficult to correct". As Harlen (1985) further explains the longer the non-scientific ideas have been held, the more difficult they are to change. Therefore when a student conceives a misconception at the primary stage this

situation is more risky. It will finally obstruct concept development in the secondary stage and even at the tertiary levels.

According to the education reforms introduced in 1997, the primary cycle has been divided into three key stages. Key stage one consists of grades 1 and 2; Key stage two consists of grades 3 and 4; and the key stage three consists of grade 5. The primary curriculum consists of four main subject areas, First language, Mathematics, Environment Related Activities (ERA) and Religion (Primary Education Planning Project, 2000). Science is integrated in this new subject Environment Related Activities. The aim of this study was to develop hands-on activities to prevent threats of possessing science misconceptions among students through the subject Environment Related Activities

Specific Objectives

Identify the activities in the teaching learning process where students possess misconceptions

Develop hands-on activities to prevent threats of possessing misconceptions

Prepare lesson plans with teachers to introduce planned activities

Try out planned activities and to make necessary improvements

Methodology

This study was conducted in three phases. In the first phase classroom observations were conducted in ten classrooms at key stage one selected from three schools in Kegalle district. These observations were planned to identify the activities where students possess misconceptions. All the observed lessons were tape-recorded and detailed field notes were prepared. Semi-structured interviews were conducted with randomly selected teachers to make clarifications of weaknesses identified in presenting activities. A questionnaire was administered to 70 primary teachers to understand the difficulties in planning and presenting activities to the students. Data obtained from the above sources were analyzed using triangulation. During the second phase of the study activities were developed and lesson plans were prepared with the teachers to present those activities to the students. Planned activities were tried out in five classrooms in the third phase of the research.

Results

The results arising out of data was suggest that 90% of teachers were not competent in presenting science related components and it led students to have misconceptions. It was found that out of the 16 themes in key stage one, "*Play with water*" and "*Play with light*" were the most common themes where students possessed misconceptions. "*Sink and float*" activity, "*dissolving things in water*" and "*shadow activity*" were the most prominent activities where students had misconceptions. The way the teachers presented those activities too greatly affected leading to

misconceptions among students. Teachers did not possess a very clear plan of presenting activities. In developed hands-on activities, teachers presented activities very carefully avoiding opportunities of possessing misconceptions among students. The detailed lesson plans prepared for each activity helped them to present those activities with much confidence and correctly. Students actively engaged in those activities and they were able to develop skills of doing science with the guidance of the teachers. Teachers were really happy with the developed activities and they responded positively.

Discussion

Most of the teachers were incapable of presenting science related activities without allowing students to have misconceptions due to their limited science background. Teachers' over explanations, incorrect explanations and incorrect use of scientific terms resulted in having misconceptions. Especially teachers' questions had a profound effect in having misconceptions among students. As teachers did not use a proper plan in presenting activities they tend to ask several questions allowing room for misconceptions. When teachers introduced planned activities foundation for science concept development was gradually laid down without interference with misconceptions. Collaborative work with teachers helped them to understand their inadequacy of science subject matter knowledge and to plan activities to present them more meaningfully.

Conclusion

Continuous collaborative work with primary teachers is needed to facilitate the teachers to present activities in ERA to lay a proper foundation in learning science. This guidance should be done by experienced personnel in the field of education

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