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Teachers and children's misconceptions in science'

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Background

When talking about natural science in early year's education we refer to children's understanding about the world and its development (Johnston & Gray, 1999). This includes experiences from their everyday lives and scientific phenomena that help children discover the world in which they live and, as a result, develop skills and understandings. Thus, children based on their early experiences might form ideas that may be partially formed or scientifically inaccurate (Johnston & Gray, 1999). Such ideas are known as "alternative frameworks/ideas", "misconceptions" and/or "preconceptions" (Johnston & Gray, 1999). For the purposes of this paper, the term "misconceptions" will be used as it is the most widely used term in the literature and by this we will refer to "children's ideas that differ from definitions and explanations accepted by scientists" (Schmidt, 1995, p1).

Nowadays, it is generally accepted that early years' children do not come to school as a "tabula rasa", in other words children already have knowledge and scientific concepts before entering formal education, which will affect their school learning of science (Pine, Messer & John, 2001). These ideas that children bring into science lessons are well established in their ways of thinking and some of this knowledge is incorrect and remarkably resistant to change (Treagust, 1988; Black & Lucas, 1993). In addition, teachers seldom have the time to identify children's misconceptions and are often forced to assume a certain base level of students' knowledge (Chen, Kirkby & Morin, 2006). However, leaving children to their misconceptions and hoping that they will overcome them on their own is "unfair" plus if children's misconceptions are known, then teachers can plan lessons to clear them up (Schmidt, 1995).

It is important for teachers to take account children's prior knowledge and misconceptions as Pine et al highlighted that a part of teachers role is to organize the child's misconceptions into coherent concepts, which are accurate and explicit (2001). It is important because children's misconceptions can get in the way of the teaching process and findings suggest that children hold many incorrect ideas about science topics which are of considerable importance (Pine et al, 2001). Similarly, Eaton's et al (1984) research revealed that student's misconceptions might interfere with science learning.

Research Questions

Much research has been done in regard to children's misconceptions in science (Eaton, Anderson and Smith, 1984); though, there is still more to investigate in regard to what early years' teachers know and do about misconceptions. Considering all the above, this research is focused on Cypriot early years' teachers and their views on children's misconceptions and specifically it aims in answering the following questions:

- What do teachers' know about children's misconceptions in science? · Do they identify them and, if yes, how do they accomplish that? · How do teachers link children's misconceptions with a new concept when planning a lesson? · How do teachers respond and use children's misconceptions during lessons?

Methods

The research will be conducted with Cypriot early years' teachers and will be completed in two phases. The first phase will identify key topics on which the research will focus. This will occur after analysing the teachers' responses to the questionnaires and the key informants' interviews (two

Cypriot university lecturers and researchers). The second phase includes lesson observations and focus groups.

Research findings

Researching children's misconceptions is crucial and the earlier we study them the better we can work with all sides of children's thought (Ravanis & Bagakis, 1998). Thus, the aim of this research is to make public the importance of taking into account children's misconceptions when teaching science as they can prevent learners' acquisition of knowledge. It is also expected to provide teachers with some suggestions in regard to science teaching and some strategies to overcome children's misconceptions.