

Making Sense of the natural world: seeds and plants

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Abstract

The aim of this article is to describe the teaching and learning situations that occurred in elementary schools as observed by the authors as they supervised teaching practice during the Experimental Science for Primary School Teachers Programme.

Over the past few years, efforts have been made in Portugal to invest in the training of early years teachers in experimental science education, one such case being this training programme funded by the Portuguese government. The programme aims to improve the teachers' practice in experimental science, supported by classroom activities that contribute to children's scientific literacy, in order to make sense of socio-scientific issues.

In this article, the authors present and analyse some of the ways that children (from 6 to 8 years of age) find to explain the natural world, as well as examples of strategies used by teachers to help the children to understand scientific ideas, here illustrated through the theme of germination. Data were collected during the course of supervision work by the authors.

Keywords: experimental science; primary school; learning; teaching; germination.

Introduction

Teacher education is the key factor determining the quality of science education that schools can provide. No resources can ever be effective if teachers are not able to fully understand and use them. A view of the experimental sciences, as part of literacy promotion in the broad sense, introduces a further factor to the recognition of the importance of quality training for primary science teaching (Harlen, 2004; Sá & Varela, 2007).

Over the past few years, efforts have been made in Portugal to invest in the training of early years teachers in experimental science education, with project development and training programmes funded by the Portuguese government. The Experimental Science for Primary School Teachers Programme (Martins et al, 2006) is one example of such a programme. This kind of initiative aims to improve the school teachers' practice in experimental science, working on such themes as floating in/on fluids; dissolving in fluids; seed, germination and growth;

shadows and images; electrical phenomena; and changes of physical state or other topics listed in the National Curriculum.

The topic germination is part of the primary school curriculum, which suggests conducting experiments on and the observation of the reproduction methods of plants, specifically the germination of different kinds of seeds. Teachers are encouraged to plan activities with students, enabling them to identify environmental factors that affect plant life, such as water, air, light, temperature and soil.

Beyond methodical work, there are also important attitudes that science can promote, such as persistence, patience and taking care. The theme of germination is a perfect way to illustrate these skills, since we must 'sow to reap at the right time'. To do this, it is necessary to plan, wait, look after and cherish the hope that all factors, internal and external to the seed, gather for the embryo to slowly come out of its dormancy and commence a more intense metabolic activity. Germination happens when the reserves so permit, giving rise to a new plant, which starts its growth when its photosynthetic organs are able to start producing organic compounds, providing food for itself and, together with other plants, to the ecosystem. The question of time, cycle, sustainability, conservation and diversity is very important to keep in mind and children should be encouraged to discover new meanings, reflecting on the world of science and its language and attempting an appropriation of the real world in a more holistic and systematic way.



We describe ways that children use to understand germination and the development of plants, and approaches that teachers have developed to help them in the process of thinking and constructing knowledge, during a period of training carried out by the authors with these teachers. Our attention focuses especially on the meanings, and how meanings are generated and mediated in the classroom. We support a teaching and learning perspective of science that emphasises knowledge construction and reflective thinking in a social context of communication and co-operation, where the activities are personally relevant to the child and induce socio-emotional and intellectual development (Harlen, 1992; Howe, Davies, McMahon, Towler & Scott, 2005; Oliveira et al, 2009).

JES5 Summer 2013 22