Can Teaching the Skills of Scientific Enquiry Benefit Children with SLD and PMLD?

Rationale
In recent years the teaching of primary science across the UK has often been at the centre of many debates (Gebbels, Evans and Murphy, 2010), however very little discussion has been focused on the teaching of science to those with special educational needs (SEN). Kite (1987) suggested that science has characteristics which make it more accessible for children with SEN, who may struggle with more academic subjects, where the ‘answers’ are limited to right and wrong. However Smith and Gunstone (2009) argue that the focus of science within primary schools should be on those who will become our scientific elite.

Peacock (2012) writes on the idea of right and wrong. He highlights that the majority of the teaching profession is made up of females, most of whom are parents, suggesting that the parenting outlook they bring into their work, promotes, among other things, the idea of learning right from wrong, which completely goes against the scientific thinking. Over the last four years, there has been an increase each year of children with a statement of SEN and PMLD. Bell (1998) states that traditionally children with SLD and PMLD are rarely given scientific problems to explore.

For these reasons, we shall explore whether the learning of scientific enquiry skills can be beneficial for children with SLD and PMLD. Due to the lack of research specifically in this area, findings will be developed by comparing the benefits of scientific enquiry skills to the specific needs of children with SLD and PMLD.

What is SLD and PMLD?
Holden and Crooke (2005) define the term ‘severe learning difficulties’ (SLD) as substantial intellectual and/or cognitive impairment. Odes (2015) adds to this, explaining that children with SLD often need support in accessing the whole curriculum, as well as communication and mobility issues. It is likely that children with SLD will be working at the higher end of the P scales, the attainment targets set below national curriculum level 1, and created for children with SEN (Dfes, 2014), or at the same level as the old national curriculum level 1, throughout most of their time at school (Holden and Crooke, 2005). Their learning difficulties may be more complex than those with SLD (Odes, 2015). Holden and Crooke (2005) predict that children with PMLD’s achievements will often remain within the lower end of the P scales for the entirety of their time in education.

In addition to severe learning difficulties, children with ‘profound and multiple difficulties’ (PMLD) have other prominent difficulties such as serious medical conditions, sensory impairment and physical disabilities (Holden and Crooke, 2005). Their learning difficulties may be more complex than those with SLD (Odes, 2015). Holden and Crooke (2005) predict that children with PMLD’s achievements will often remain within the lower end of the P scales for the entirety of their time in education.

What is scientific enquiry?
Sharp, Peacock, Jobnsey, Simon, Smith, Cross and Harris (2014) define scientific enquiry as ‘A learning experience in which the child takes some responsibility for the planning, execution and reflection of an investigation of a science phenomenon’ (Sharp et al, 2014, p 46). Turner, Keogh, Naylor and Lawrence (2011) offer some alternative opinions to this, concluding with their personal view that scientific enquiry is the process children follow to find the answers to scientific questions based on the world around them.

Turner et al. (2011) identify five different types of enquiry: observing over time, identifying and classifying, pattern seeking, research, and fair testing. The process used for each type of enquiry normally follows the pattern of exploring, collecting and analysing evidence, and researching a suitable and satisfying outcome. (Turner et al, 2011). However, Harlen and Quarrier (2009) argue that there is no definitive list of enquiry skills, stating that they are viewed differently depending on the curriculum and programme being followed.

Benefits of Scientific Enquiry
Humans are a naturally inquisitive species, this is present in all children from very early on in their lives (De Bóó, 1999). This natural curiosity leads to early exploration, observation and experience, all of which influence children’s initial ideas and understandings of the world around them (Harlen and Quarrier, 2009). Harlen and Quarrier (2009) believe the characteristics of these ideas can indicate what areas of scientific understanding children need to develop, as well as how to develop them.

The first step in the process of scientific enquiry, proposed by Turner et al. (2011), is exploring. Turner et al. (2011) believe that exploration is a crucial part of any scientific enquiry, as it is during this stage that children fully explore and play with the object or event they will use for their scientific enquiry. After duration of exploring children find it easier to work in a more careful systematic manner.

As within exploration, Hollins and Whitty (2012) express the importance of hands on experience with any part of scientific enquiry. Hands on experience is not limited to carrying out practical experiments, it enables children to develop their knowledge and skills in small steps through activities which capture their imagination and hold their attention.

Children with SLD and PMLD often have poor communication skills (Holden and Crooke, 2005). Scientific enquiry allows them to not only develop their skills in enquiry, but also encourages them to interact with their peers, whether that be through spoken words or the use of signs and symbols.

Turner et al. (2011) state that this process of scientific enquiry is the same for any age, therefore suitable for children at any stage of development. It is the skills used within that process that should be developed as a child moves through school.

De Bóó (1999) expands on this, stating that enquiries involve cooperation and communication with others, encouraging children to develop skills in self-control, social interaction, confidence and the ability to adapt to changing environments.

The National Curriculum Council (1991) emphasises the importance of hands on experience for children with SLD and PMLD, stating that it enables children to develop their knowledge and skills in small steps through activities which capture their imagination and hold their attention.

The National Curriculum Council (1991) believed that every pupil with SEN should have the opportunity to access science. Bell (1998) agrees with this, highlighting the significant contribution science can have for children with SLD and PMLD, suggesting that science encourages children to develop their skills which enables them to become more confident in their abilities. The National Curriculum Council (1991) adds to this, explaining that the characteristics of scientific activities allow children with SEN to achieve success.

Bell (1998) goes on to state that if children are not provided with the opportunity to access the science curriculum, the opportunity to develop these skills will be missed.

Findings
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Next Steps
Mooney (2000) writes of Dewey’s theories on learning, stating that Dewey shared Piaget and Vygotsky’s core ideas on education. He felt, education should be child centred and involve the child’s social world and community, it should not only be active but also interactive (Mooney, 2000). Dewey (1938) theorised that as teachers play such an important role in the education of children, they should be confident in their own skills and abilities. Dewey also states the need to provide children with active experiences to allow them to develop their scientific thinking.

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