

## Teaching Children about Their Brains: Evaluating the Role of Neuroscience Undergraduates in Primary School Education

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**Abstract :** Many children leave primary school having formed preconceptions about their relationship with science. Thus, primary school represents a critical window for stimulating scientific interest in younger children. Engagement relies on the provision of hands-on activities coupled with an ability to capture a child's innate curiosity. This requires children to perceive science topics as interesting and relevant to their everyday life. Teachers and pupils alike have suggested the school curriculum be tailored to help stimulate scientific interest. Young children are naturally inquisitive about the human body; the brain is one topic which frequently engages pupils, although it is not currently included in the UK primary curriculum. Teaching children about the brain could have wider societal impacts such as increasing knowledge of neurological disorders. However, many primary school teachers do not receive formal neuroscience training and may feel apprehensive about delivering lessons on the nervous system. This is exacerbated by a lack of educational neuroscience resources. One solution is for undergraduates to form partnerships with schools - delivering engaging lessons and supplementing teacher knowledge. The aim of this project was to evaluate the success of a short lesson on the brain delivered by an undergraduate neuroscientist to primary school pupils. Prior to entering schools, semi-structured online interviews were conducted with teachers to gain pedagogical advice and relevant websites were searched for neuroscience resources. Subsequently, a single lesson plan was created comprising of four hands-on activities. The activities were devised in a top-down manner, beginning with learning about the brain as an entity, before focusing on individual neurons. Students were asked to label a 'brain map' to assess prior knowledge of brain structure and function. They viewed animal brains and created 'pipe-cleaner neurons' which were later used to depict electrical transmission. The same session was delivered by an undergraduate student to 570 key stage 2 (KS2) pupils across five schools in Leeds, UK. Post-session surveys, designed for teachers and pupils respectively, were used to evaluate the session. Children in all year groups had relatively poor knowledge of brain structure and function at the beginning of the session. When asked to label four brain regions with their respective functions, older pupils labeled a mean of 1.5 ( $\pm$  1.0) brain regions compared to 0.8 ( $\pm$  0.96) for younger pupils ( $p=0.002$ ). However, by the end of the session, 95% of pupils felt their knowledge of the brain had increased. Hands-on activities were rated most popular by pupils and were considered the most successful aspect of the session by teachers. Although only half the teachers were aware of neuroscience educational resources, nearly all (95%) felt they would have more confidence in teaching a similar session in the future. All teachers felt the session was engaging and that the content could be linked to the current curriculum. Thus, a short fifty-minute session can successfully enhance pupils' knowledge of a new topic: the brain. Partnerships with an undergraduate student can provide an alternative method for supplementing teacher knowledge, increasing their confidence in delivering future lessons on the nervous system.

**Keywords :** education, neuroscience, primary school, undergraduate

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