Research methods

Questionnaires followed by semi-structured interviews were completed before and after the project. The questionnaires had to be simple because of the age of the children and the ability range. They were carried out with each individual child. The questionnaires also included symbols to help the children to make their choices regarding a particular response to a question. I acted as a scribe for those children who found it difficult to write, or if the children had a lot to say. With such young children it is important that the process of capturing the evidence is not hindered by their level of writing. The children were asked if they liked science. We also looked at the children's perceptions of their own achievement in science.

Conclusion

The results from this study imply that teaching of science through music can have a positive impact on attitudes and attainment in science. It also has a positive impact on self-esteem. A cross-curricular approach to the curriculum ensures that learning is consolidated and that vital connections are made. Strong connections between learning in music and science were evident throughout. As can be seen in the pupil comments above, these connections make learning more powerful and purposeful.

Recommendations for partnerships with creative professionals from other fields

- Flexibility is essential. (If an activity does not appear to be working, partners need to adapt activities to the needs / abilities of the children.)
- The development of an effective working relationship between the teachers and the providers is essential.
- Time needs to be provided to allow for this relationship to develop, e.g. staff meeting before workshops begin. Teachers appreciated the chance to meet Eugene and experience some of the activities before the project began.
- It is essential for teachers to take part in the workshops with the children, but it is also important for them to take time to observe how the children react to the sessions.
- Action Researchers need to 'know' the teachers who are involved to enable them to plan a project that will have a positive impact on the teachers as individuals. The project needs to have an impact on the teachers and their practice. Teachers need to believe in the process if we want the approach to be sustainable (Emotional Intelligence). The results of the Action Research need to be shared with the staff to enable them to see the impact on the children's attitudes and attainment. The results provide a powerful justification (if one is needed) for adopting a more creative / innovative approach to the teaching of science and teaching as a whole.
- If we are saying that children learn more effectively through innovative methods / approaches, what about the teachers? We need to think about staff meetings and CPD – more active learning please!

Suggestions for further reading

Primary Horizons 'Starting out in Science' Wellcome Trust Sept 05 www.wellcome.ac.uk
Excellence and Enjoyment Document DFES May 2003
Murphy C. and Beggs J. Children's perceptions of school science. *School Science Review* 2003
Postnote: Primary Science London: Parliamentary Office for Science and Technology (POST) 2003
Eugene Skeef www.eugeneskeef.com

Author and contact details

For more information on the project and its impact please contact:

Janet Chapman
Light Oaks Infant School
Lancaster Road
Salford
M6 8LU

Tel. 0161 788 8099

Janet.Chapman@salford.gov.uk

This publication has been supported by the DfES Innovation Unit
http://www.standards.gov.uk/innovation-unit

National Teacher Research Panel
engaging teacher expertise

Creative Science

National Teacher Research Panel
engaging teacher expertise

This summary was commissioned by the National Teacher Research Panel for the Teacher Research Conference 2006, which explored and celebrated teacher engagement in and with research. All conference materials are available at www.standards.dfes.gov.uk/ntrp

Aim of the project

The aim of the project was to explore the impact of innovative teaching methods on attainment / achievement and attitudes in science. This project focused on the teaching of sound through music. The overall aim of the project was to encourage teachers to be more creative in their approach to science teaching in order to make science more interesting, exciting and engaging for the children.

Dimensions of the study

Project Participants

Year 2 teachers and children at Light Oaks Infant School were involved in the project but the Action Research focused on eighteen children. The eighteen children included a boy and girl from each ability range (high, average and low achievers) from each of the three classes.

Project Partners

Musician – Eugene Skeef (London). Eugene was the musician on the PAL Creative Science Teaching Lab II. Scientists – Dr. Andy Moorhouse and postgraduate students from the Acoustics Department at Salford University.

Summary of main findings

- The project was linked to a major improvement in the childrens' attitude to science.
- Most children used the word 'excited' to describe their feelings about science.
- There were marked improvements in the children's perceptions regarding their own achievements in science.
- The childrens' knowledge and understanding of sound across the ability range increased.
- There were strong connections between learning in music and science evident throughout.
- Following the hands on nature of the activities, the children were able to talk about their learning in more depth.

Background and context

This research grew out of a concern that science in school was lacking some of the excitement that it once had due to over reliance on QCA schemes and inflexible lesson plans that were beginning to be used year on year. There was also too much emphasis on the content rather than investigative skills in science teaching. The need for more open-ended, child-initiated learning to stimulate interest and enthusiasm in science was becoming all too apparent. Science teaching and learning should be FUN!

One of the reasons that I wanted to look at the teaching of science through the arts is that I have always had a personal interest in both but was persuaded to choose science at secondary school. Along with an NQT I wanted to explore the possibilities of teaching science effectively through the arts. We joined PAL Creative Science Teaching Lab II at Bore Place, Kent, which comprised of 12 teachers, 3 scientists and 4 artists. We have further developed the project by leading our own inservice training, and applying for funding through Creative Partnerships to carry out action research.

The research was carried out at Light Oaks Infant School, a primary school whose 289 pupils come from diverse socio-economic backgrounds. The school is situated in Salford and has many of the challenges of inner-city schools, including high mobility, high numbers of children receiving free school meals, and an increasing number of children with special educational needs.

Teaching processes and strategies

A session for staff development was planned to introduce the teachers to Eugene and to give them an opportunity to experience some of the activities that the children would be involved in throughout the week. Eugene introduced the staff to the water drum (a drum partly filled with water to modify its pitch and timbre), and many other new and exciting instruments. The staff took part in games, singing and movement. One teacher said that it was "the best staff meeting ever". All the ideas could be adapted for use in the classroom and the water drum provided an excellent stimulus for music and scientific investigations at all levels.

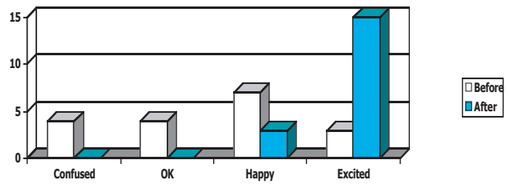
Following the staff meeting every class in school worked with Eugene and they were introduced to the water drum. The children in Year 2 had a longer session. Children worked with the water drum, udu (another type of drum originating from Nigeria) and many other instruments. They explored sound and rhythm patterns. The teachers developed the idea of the water drum in their classes and children explored using different materials to create their own water drums in their water trays. Parents came to tell us about water drums that the children had created at home.

Having worked with Eugene, the children in Year 2 then had the opportunity to carry out further investigations using the idea of the water drum. Did the size of the drum or the material it was made from make a difference to the sound it made? Did the kind of beater used make a difference? What happened to the water when the drum was played? They also worked on activities set up by the team from Salford University. During the session the children started to look at changing the pitch and loudness of sounds. The activities included investigating hosepipe trumpets, sound measurement, drainpipes and flip-flops, musical boxes and wave patterns using a slinky. These activities enabled the children to explore sound in a variety of meaningful ways.

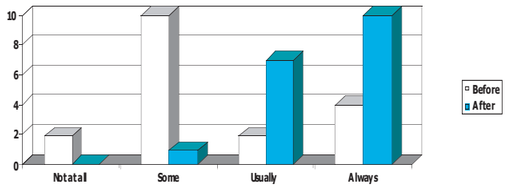
The Findings

The eighteen children were questioned before and after the project. The results are shown in the graphs.

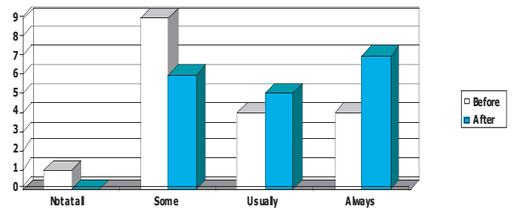
Feelings towards science



Do you like science?



Do you think you are good at science?



Evidence of attainment for one child

Following the project children were able to talk at length about their experiences. The children developed quite a deep level of understanding in relation to sound. The children were asked the question, "What do you know about sound?" before and after the project activities. Before participating in the activities the children's responses were typically brief. At the end of the project, on the other hand, children had much more to say, and their responses revealed that they had gained a deep understanding of important scientific principles. The following responses of one child were typical.

Responses to the question, "What do you know about sound?" **before** the project activities

- "Noise"
- "Sometimes it's fun to be loud."

Responses to the question, "What do you know about sound?" **after** the project activities

- Sounds can be really, really noisy.

Sound measurement activity

- It can be fun making noises in the playground. We were finding out who could make the loudest sound. We used a blue box with a silver stick and a black sponge. The numbers tell you how loud you were shouting. When we were close the sound was loud and the numbers went up. When we moved away the sound made the numbers go down.

Hosepipe trumpet activity

- Hosepipes can make a loud sound with a mouthpiece. Long pipe not much sound. The air travels so far you have to blow really hard.

Water drum activity

- The water drums were like Eugene's drums in his country when you go up and down (referring to the change in sound when the small bowl is lifted in and out of the water).
- The basketball didn't work. It's a round ball. It keeps rolling around and you can't lift it up. The balls made different sounds. If they were hard, they made deep noises. If they were soft, they made a higher sound.
- The metal tray made a high sound out of the water and a low sound in the water.
- Big bowls made deep sounds. Small bowls made high sounds.
- There was air in the bowl. The water was vibrating and the air.

Musical box activity

- When the musical box workings were put on the box the box vibrated. At home when I put my hand on the musical box it vibrates – talked about her hand shivering.

Drainpipe activity

- Long tube – deep sounds. Short tube – high sounds.

The additional benefit of this approach was that its flexibility allowed the children to explore and develop their own confidence and creativity, e.g. children working with the drainpipes created their own musical composition. Strong connections between learning in music and science were evident throughout the project.