Science and technology awareness for preschool children: A case study

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INTRODUCTION

A serious problem that needs to be addressed with urgency in South Africa is the skills shortage that exist. The Youth into Science Strategy document (2006) from the Department of Science and Technology states that career sectors most affected by skills shortages are professional engineers, scientists, surveyors, chartered accountants, actuaries, project managers, artisans and information technology specialists.

TekkiTots is part of the Young Engineers of Africa (YESA) research area within the emerging technologies group of ICT in education, youth and gender research group at the Merafka Institute of the CSIR. The aim of YESA is to increase the pipeline for the generation of more scientists, engineers and technologists by creating opportunities to grow interest and involvement of learners, starting from the Grade R level right through to Grade 12.

OBJECTIVE

The goal of TekkiTots is to introduce the words ‘science’ and ‘technology’ to preschool children as an age-appropriate, meaningful positive experience. The intention is that children will then have these positive experiences as references to support their developing interests and attitudes towards science and technology.

The intended outcomes of TekkiTots are:

1. Children with positive attitudes towards science and technology
2. The words ‘science’ and technology mean something to the children.
3. Children after three lessons will build upon the foundations we laid down. TekkiTots was the highlight of the week.
4. Questions from schools to enrol in the project. Students and teachers with a positive attitude or willingness to allow the preschool teachers to enroll in the project. Students and parents interested in the project. Students and teachers interested in the project. Students and parents interested in the project. Students and parents interested in the project.

METHOD

The TekkiTots project is based on the action research approach of Zuber-Skerritt as cited by Louw, as a method with the purpose to gain knowledge and appropriate skills in a preschool environment. Through action research it is possible to get first-hand experience and understanding of the challenges for a preschool teacher/educator when introducing science and technology to preschool children.

Action research is a cyclical process where the outcomes and experiences of the first cycle serve as input for the actions and research in the next cycle. Each action research cycle includes planning, acting, observing and reflecting. The result is then the refinement of the actions planned for the next cycle.

THE MODEL

OUTCOMES

<table>
<thead>
<tr>
<th>Grade Cycle 1</th>
<th>Grade Cycle 2</th>
<th>Current Grade 3</th>
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</thead>
<tbody>
<tr>
<td>1 school (Morning Star Montessori)</td>
<td>1 school (Morning Star Montessori)</td>
<td>1 school (Morning Star Montessori)</td>
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<tr>
<td>10 children</td>
<td>9 children</td>
<td>10 children</td>
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Comments from students 2007

“...we were strongly touched by the kids of Brooklyn Pre-Primary. The irony is that we learned so much – beyond our expectations - and hope that they will build upon the foundations we laid down. TekkiTots was the highlight of our year.”

What we have learned:

1. Patience. Teaching young kids is not the same as teaching adults; they take time to understand things; you need to be patient.
2. Time management. Managing my time between school and the 40 hours of interpersonal skills. How to integrate people’s ideas with mine and take time to understand things; you need to be patient.
3. Communication. It is very difficult to get kids to understand what you are trying to teach them. You need to put certain things in a language that they understand.
4. You also need to use special techniques in order to get their attention or calm them down when they get out of control.

Comments from schools and parents feedback 2007

“The kids are still talking about TekkiTots and it makes me feel good to think that we have had an impact. It’s nice to have positive feedback from the children and the parents.”

CONCLUSION

The outcomes that were initially overlooked were the influence the project would have on the parents. A person is more inclined to teach subjects of personal interest and background. The UP students at the Engineering, Built Environment and IT (EBIT) faculty all have Grade 12 science and therefore have enough subject background to feel comfortable to present the simple content to preschool children. These students are enthusiastic and positive about the TekkiTots intervention and have a positive influence on the preschool teachers. The teachers get the opportunity to stand back and facilitate the TekkiTots lesson from a comfortable distance, but have the opportunity to engage and continue with TekkiTots for another year. A good example of where teachers will ‘translate’ the teacher is at the Morning Star Montessori Preschool where the teachers will be presenting science and technology in 2009. The parents are reached through the child’s experiences at school. The students valued and enjoyed the opportunity to work with the children. It is important to remember that these students will be tomorrow’s parents who will have positive influences on their children and the children they have to care for.

Science and technology can be successfully presented to preschool children at a level they can understand. The question lies in the sustainability and scalability of such interventions to try and reach as many children, teachers and parents as possible. Critical contributors to the success of the TekkiTots project are:

1. A champion to take personal ownership of the project
2. Dr Martina Jordaan and the community-based project she runs for students in the University of Pretoria, Engineering, Built Environment and IT faculty
3. Energetic, enthusiastic students from the University of Pretoria
4. A school and teachers with a positive attitude or willingness to allow the preschool teachers to enrol in the project
5. Parents allowing their children to explore science and technology
6. Lesson content and material.

ACKNOWLEDGEMENTS

1. Dr Martina Jordaan and the Engineering, Built Environment and IT (EBIT) faculty Students
2. Jenny Miller and Morning Star Montessori Teachers and Parents, Brooklyn Pre-primary, Summerplace Primary, Xavier and Florians, Tomatoes People Hatfield, Unisa Centre and Florians preschools

REFERENCES

2. GUMENEKHE, B., et al. (2007) Student feedback from Science, Technology, Engineering and Mathematics in Grade 12 in South Africa. ALARP.

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