

Title**What do children learn at an interactive road safety exhibition?****Author**

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Abstract

This study (work in progress) aims to investigate children's learning at an interactive road safety exhibition called 'RoadZone' run by the NRMA and Questacon. The study's basis is the theory that children construct new learning through an active process of modifying existing learning. Utilising a grounded theory framework, data is being collected using pre and post visit concept maps, and through interviews and video taping of children's interaction at the exhibition. Preliminary analysis of the limited data available at this stage indicates that more sophisticated road safety concepts are being reported on post visit concept maps than pre-visit. Interaction between children and exhibits is relatively long and exploratory in nature. Interaction between children themselves at the exhibition takes place in small groups and is characterised by discussion, direction and prediction. Methodological problems have been identified for consideration in subsequent data collection periods.

Notation

All references to NRMA in this paper relate to NRMA Ltd. (trading as NRMA Member Services). All references to Questacon relate to The National Science and Technology Centre, Canberra.

Introduction

From the very earliest times in the history of motoring, the issue of improving safety on our roads has been increasing in significance. During the 1990s in Australia, community concern for road safety reached a high level of significance with multi-million dollar programs implemented across the fields of engineering, enforcement, education, encouragement, and evaluation in order to reduce the levels of trauma being suffered by road users.

A key component of this integrated approach to road safety in NSW has been the introduction of road safety education in schools. Since 1987, primary and high schools in NSW have had access to classroom resources and professional support aimed at assisting teachers to integrate road safety into their work programs. In 1993 road safety was included in the Personal Development Health and Physical Education key learning area, providing teachers with a formal curriculum base including objectives, outcomes and suggested units of work.

NRMA has been a key stakeholder in road safety since its inception in the 1920s. When road safety education in schools gathered momentum in the late 1980s, NRMA supported the program by assisting with funding for classroom resources. This support was based on the belief that early learning of safe road use behaviours and attitudes was crucial to children's safety through their school years, and would contribute to their development as safer drivers of the future.

To support this belief, NRMA developed the concept of a road safety exhibition for children that would complement and reinforce the road safety education being provided by schools. Together with project partners Questacon, in Canberra, NRMA developed and launched Tomorrow's Drivers, an interactive road safety exhibition for 9 - 14 year olds. This exhibition toured through metropolitan and regional NSW, Victoria and Queensland over the period 1993-1998 and school groups were encouraged to visit the exhibition as an excursion. The exhibition cost NRMA \$1 million and was visited by more than 60,000 children during its lifetime.

The success of Tomorrow's Drivers led to a new exhibition called RoadZone being launched in 1999, continuing the concept of using interactive exhibits to help children learn about road safety issues. With a touring program planned through until 2003, NRMA has committed \$2.5 million to the exhibition.

By the time RoadZone has finished its program in 2003, NRMA will have committed almost \$4 million and 10 years of effort to the concept of interactive learning of road safety. The question should then rightfully be asked, are children learning about road safety from a visit to RoadZone? This paper explains the progress of a research project and thesis to answer this question. The issues being investigated in this research are:

- Are children learning, and if so, what are they learning about road safety from a visit to RoadZone?
- What role does the interactive nature of RoadZone play in facilitating learning?
- What effect, if any, does the interaction between children themselves at RoadZone have on their learning?

The Learning Context in RoadZone

Two concepts related to learning were central to the development of RoadZone, and therefore this research: constructivism and interactive learning, particularly in relation to science.

Constructivism as an approach to learning developed from the early work of Piaget whose central assumption was that children are active participants in the development of knowledge, constructing their own meanings and understandings (Bee, 1995). He emphasised that learning was an adaptive process with the learner organising and re-organising their experiences over time as they moved through developmental stages.

In summarising the key principles of constructivism, Hendry (1996) highlighted the link between the constructivist approach to learning and the role of interactivity in facilitating learning. Among other principles he highlighted:

- The meanings or interpretations people give to things depend on their knowledge.
- Knowledge is constructed from within in interrelation with the world.
- Knowledge is constructed through perception and action.
- Construction of knowledge requires energy and time.

Interactive learning is closely related to constructivism. It is a more specific form of the general educational concept of active learning which holds that people learn more effectively if they are actively involved in the task. This active involvement means more than just 'doing'. It means that the learner must have the opportunity to structure their learning experience, control the pace and emphasis of their learning and have the opportunity to make choices and decisions as part of the learning experience.

Science centres such as Questacon bring these two concepts together. They use a constructivist approach and an interactive setting to create a high quality learning environment related to specific content areas. This approach has characterised science centres since they first started to appear internationally in the 1970s. They were seen to be at the vanguard of what is often called the 'third generation' of museums. Third generation museums were quite different from previous generations because they were centred on the transmission of scientific concepts and ideas rather than being object or science history centred. Their main aim was to teach, and they were interactive from their inception (Thier and Linn, 1976; Feher and Rice, 1985; McManus 1992). Writing in the early part of this period in museum development, Screven (1974, p. 67) claimed that the "primary intention of most exhibits, implicitly or explicitly, is to teach something - to communicate some message aimed at changing the viewer's knowledge, perceptions, sensitivities or attitudes."

In the case of RoadZone, the content area is road safety. With these optimal factors for learning in place, the question being investigated here is the extent of that learning, and the role of the interactive nature of the exhibition in promoting that learning.

Methodology

The questions which drive this research are based on three issues: what is being learned by children; what role the interactivity of the exhibits plays in facilitating learning; and what role the interaction between children themselves plays in facilitating learning.

To collect data to answer these questions, several data collection methods are being used. Constructivism holds that people develop new knowledge by building on existing knowledge and understandings. Therefore data must be collected to determine the extent of children's knowledge of road safety before they attend the exhibition, and then compared with data collected following their visit. This will indicate if any new learning has taken place, and what that new learning is.

To do this, concept mapping is being used before and after the children visit the exhibition. Concept maps are learning tools which illustrate components of a broader concept and the ideas which link those components, allowing children to build on concepts they know to incorporate new ones (Manahan, 1995). In this study children are introduced to concept mapping at school prior to their visit to the exhibition, and asked to construct a concept map of 'being safe on the road'. These maps are collected by the researcher and redistributed to the children following their visit. They are then encouraged to add to their concept map anything they learned while at the exhibition. This is done in a different coloured pen to distinguish between pre and post visit learning.

The interaction between children and exhibits, and between children themselves is being analysed using data collected through observation and video recording. These forms of data collection allow the researcher to capture data while the interaction is happening in the form of field notes, and then review the same interaction on video, providing as it does both vision and sound. Hammersley and Atkinson (1983) highlight the usefulness of video recording particularly in relation to research which focuses on social interaction, a key part of this research project.

These data are being analysed using the analytical coding and theoretical sampling procedures which are part of the grounded theory process.

Results

This research is still in progress and at this stage data have been collected from two class groups which visited the RoadZone exhibition while it was at Questacon in Canberra in May 2000.

Preliminary analysis of this data indicates that learning is taking place at the exhibition. Of the children who have attended in these sessions (n=120) 97% have been able to add to their concept maps in the post visit sessions. One emerging theme is that the nature of what children identify as relating to the concept 'road safety' is quite different post-visit. In the pre-visit sessions the children generally construct concept maps which reflect basic road safety tenets. These include ideas such as 'look both ways before you cross the road', 'click clack front and back', wear your helmet when you ride', 'don't drink and drive' and 'don't speed'. While these are necessary concepts and are not being down-graded in importance, it is noticeable that the sophistication of concepts which are added post-visit is significantly increased. These include ideas such as 'it's hard to judge how fast cars are going', 'airbags help stop injuries', 'it's hard to concentrate on two things at the same time', and 'crumple zones in cars help to protect passengers'.

Only limited analysis of the video data has been possible at this stage. Several themes have begun to emerge:

- Most exhibits are attempted by small groups of children. It is unusual for children to work on an exhibit alone.
- In these small groups there is usually one child who is 'doing' the exhibit while others watch. Those watching often provide advice or direction.
- Conversation is constant in the small groups. It is characterised by children discussing the road safety concept involved in the exhibit, describing the action and predicting outcomes.
- Attention at most exhibits is held for relatively lengthy periods, often 3 to 4 minutes, sometimes even longer.
- Interaction with the exhibits is quite exploratory. For example, in one exhibit where a rubber dummy has to be placed into a model car with a seatbelt, children will often experiment with putting the dummy in unusual positions such as sideways or upside down to view the outcome.

Some methodological limitations have been identified during these early sessions. Children with more limited language skills have found the concept map difficult to complete. This makes it difficult to identify their baseline knowledge of road safety before they visit RoadZone. Practical difficulties have also been identified with video recording at RoadZone. The exhibition itself is somewhat noisy, and this noise level is increased by the children themselves. Added to the ambient noise of a science centre like Questacon, this made the audio component of the recording difficult to hear. Remedies to these methodological issues are being considered for future data collection.

Conclusions

Early indications based on limited data and preliminary analysis are encouraging. Interaction of children with the exhibits is positive and exploratory. Interaction between children at the exhibition is constant and very active. At this stage it is difficult to identify the extent of any new learning of road safety concepts. However there is evidence at this early stage of more sophisticated concepts being identified by children after their visit compared to concepts identified beforehand. Further data collection and analysis will help to clarify these questions.

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