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<td><strong>Title</strong></td>
<td>Use of technology-based exhibits in science centres to foster affective and cognitive outcomes among students</td>
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<td><strong>Institute</strong></td>
<td>Thesis (M.A.) National Institute of Education, Nanyang Technological University</td>
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<tr>
<td><strong>Year</strong></td>
<td>2008</td>
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ABSTRACT

Increasingly, research in informal science education points to the integral role that it plays in complementing and enhancing the formal science education system. Informal institutions such as zoos, aquariums, science centres and museums around the world are taking heed and looking at ways to provide a truly meaningful and enriching learning experience to visitors. Science centres, perhaps the most valuable tributary to the popularisation of science, are also evolving to keep up with the technology-based economy of today. They are investing in attractions and exhibits which utilise the mediation of technology to drive the learning experience.

Though science centres abound with technology-based exhibits, there has not been any study in the research literature which sought to explore the potential for fostering cognitive and affective outcomes in the learning process among students. A study along these lines would be useful given the increasing nexus between science centres and schools.

The present study explores the use of technology-based exhibits at the Singapore Science Centre to foster affective and cognitive outcomes in the learning process among students. Through the development of evaluation instruments with good psychometric properties, this study explored three technology-based exhibits; CAVE (Cave Automated Virtual Environment), a supercomputer-based multimedia system; Digistar, a computer graphics based projection system; and the Virtual Cell, a 3-Dimensional (3-D) programme that takes viewers on a journey through a human cell.
The student subjects comprised primary and secondary school students of mixed
gender and ability. In the case of the CAVE and Digistar, primary students (10-11 year
olds) were chosen, while secondary students (13-14 year olds) were selected for the
Virtual Cell study. The same cognitive test (pre-test) for a particular exhibit was
administered 3 – 7 days before the students experienced the exhibit and immediately
after (post-test) for a particular exhibit. In addition, a survey instrument was also
administered after the session to measure the affective outcomes of the learning
experience. Results on the cognitive test scores revealed a statistically significant
improvement in scores between the pre and post-test in all cases (the exception is the
CAVE where no cognitive test was administered). This is regardless of gender and
stream. The students enjoyed the session and expressed interest in learning other
topics through the use of such technologies. The positive outcomes attest to the fact
that the addition of the CAVE, Digistar and the Virtual Cell has enabled the Singapore
Science Centre to offer new and exciting science-based programs that leverage on
technology to make learning fun and enjoyable.

Based on these findings, the study concluded that the potential of technology-based
exhibits in science centres to promote learning is tremendous and should be harnessed
fully when exploring collaborations with the formal education system. Given the cost
and technical expertise needed to man such exhibits, it is neither viable nor desirable
for schools to maintain such facilities. By tying up with schools for the offering of
such programs, an opportunity is afforded for science centres to complement the
traditional education system and further cement links with them.