Designing for and evaluating the effect of interactive television programming on the comprehension of children, aged 4 to 5.

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This thesis is presented for the degree of Doctor of Philosophy
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I declare that this thesis is my own account of my research and contains as its main content work which has not been submitted for a degree at any tertiary education institution.

Signed: Hamish McPharlin
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Abstract

Making a television programming genuinely educational for young children is a difficult endeavour; hampered primarily by the mass audience paradigm of the television broadcast. The rollout of interactive television services, such as ‘red button’, are a seemingly natural fit for enhancing the educational impact of children’s television, through providing the possibility of a reciprocal interaction in line with contemporary thinking on children’s education. However, to date, there is little evidence of interactive television applications for children that represent a compelling model of best practice.

This thesis tested the assumption that interactive television can significantly increase comprehension in young children, ages 4 and 5, when compared to comprehension results gained from non-interactive programming. This was accomplished in three phases of primary research; Exploratory, Formative, and Evaluative. In Phase 1, a series of interviews with children’s interactive television producers were undertaken in the UK and USA in an attempt to identify the elements of interactive television for children that amount to best practice. Though there is little academic literature about the affect of interactive television on children’s learning, this phase attempted to draw insight from the creators of children’s content in an effort to fill this important gap, and arrive at an understanding of both iTV best practice and the commercial barriers that hamper this approach from being realised. The feedback was collated and analysed, and a set of best practice conventions were produced. The results also found that best practice in children’s iTV is hampered significantly by the cost of development and transmission of interactivity, whether by satellite, cable, or broadband.
In Phase 2, this notion of best practice was adopted as the basis for the construction of an ‘interactive construct’; a premise for how a children’s interactive television programme might look if it was built from its inception with interactivity at its core. This construct was evaluated in at a set of preschool classes in Perth, Western Australia. 65 children were exposed to the programme, and data on the performance of the construct was gathered using an attention test, simple observation, and a drawing activity. It was found that the construct was highly engaging for young children, however one particular element was found to hinder their ability to negotiate the construct. The children were observed to be distracted at times when they switched between two simultaneous onscreen activities that bore no relation to each other. The outcome of the study was to recommend that concurrent activities must be contextually related to ensure that interacting participants are not isolated at times that viewers choose to switch streams.

Phase 3 incorporated the insight from Phase 1 and 2 into a final episode of programming for testing. An additional ‘control’ episode was created, in which the interactive elements were removed; leaving a linear programme. Finally, in response to cost concerns raised in Phase 1, an ‘Interactive Stills’ version was created, in which interactivity was in the form of a ‘simple’ execution; forsaking the rich video sequences for still screen images. The hypotheses under investigation were:

1. That the inclusion of interactivity in children’s television programming significantly increases comprehension in children, ages 4 and 5,
2. That the use of ‘simple’ iTV production techniques does not significantly reduce this impact.

199 children ages 4 to 5 from randomly selected schools in Perth, Western Australia, were exposed to the stimulus. Children were randomly assigned to one of the three cells; (1) Control, (2) Interactive Video, and (3) Interactive Stills. Data was gathered using a paper comprehension test, and coding of both attention and engagement with the programming. Statistical analysis found that children exposed to the (2) Interactive Videos stimulus on average scored a statistically significant 23% higher on the comprehension test than those in the Control. It was also found that those in the (3) Interactive Stills sample also performed better than the Control group, and did not demonstrate significantly lower comprehension scores than the Interactive Video group. Children exposed to the Interactive Video did not pay more attention to the programming than the Control group; as such, data indicates that they extracted a higher yield of processing of the programme’s educational outcomes. Behavioural measures indicated that this effect was a result of heightened expectations, and a more intellectual investment in the programming. The study arrived at a set of principles for successful production of interactive children’s programming, and concluded that the incorporation of these principles can successfully increase comprehension of content in children’s television.

It was concluded that this comprehension effect is not contingent upon production values; a critical sticking-point in the widespread rollout of iTV for children. As such,
the use of simple iTV programming, a fundamental cost-saving measure in the commercial children’s programming industry, does not diminish the positive effects seen in this research.
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