Producing an Artefact as Research: Multimedia for Young Children

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ABSTRACT

This paper examines the experiential knowledge gained in creating an artefact as an element of a research project. The author created a multimedia product for young children called "TVM", a component of a research project investigating the relationship between children, computers and metaphors. "TVM" uses metaphors to guide children in the use of nine activities specifically designed for pre-reading children. There were dual findings from the research project, the first were in relation to the topic being investigated the second were in relation to the value of creating an artefact as research. Creating an artefact as research has a history in disciplines such as fine arts however appears to lack credibility in information technology despite the valuable insight that can be gained. Engendering an artefact can contribute to a body of knowledge by providing qualitative data about a particular topic that is formulated using a deductive research methodology. The creation of an artefact may facilitate exploratory and descriptive research that can be used as a cornerstone of further research.

KEYWORDS

Artefact, research methodology, multimedia, young children, information technology.

1. INTRODUCTION

The author created an artefact called "TVM" which is an interactive multimedia product suitable for use by young children. The artefact was produced as one component of a research project investigating the relationship between young children, computers and metaphors. The premise for the research project was that the use of metaphors in computer interfaces could positively impact upon young children's interaction with the multimedia product. The production of the artefact was seen as an integral part of the research as it enabled detailed investigation of the thought processes undertaken in creating a multimedia product. Multimedia is a cross-disciplinary field of study and therefore borrows facets from several areas. The production of an artefact as research has an accepted tradition in fields such as fine art; however, the value of exploration in the process of production has taken longer to gain acceptance in the field of information technology where research in

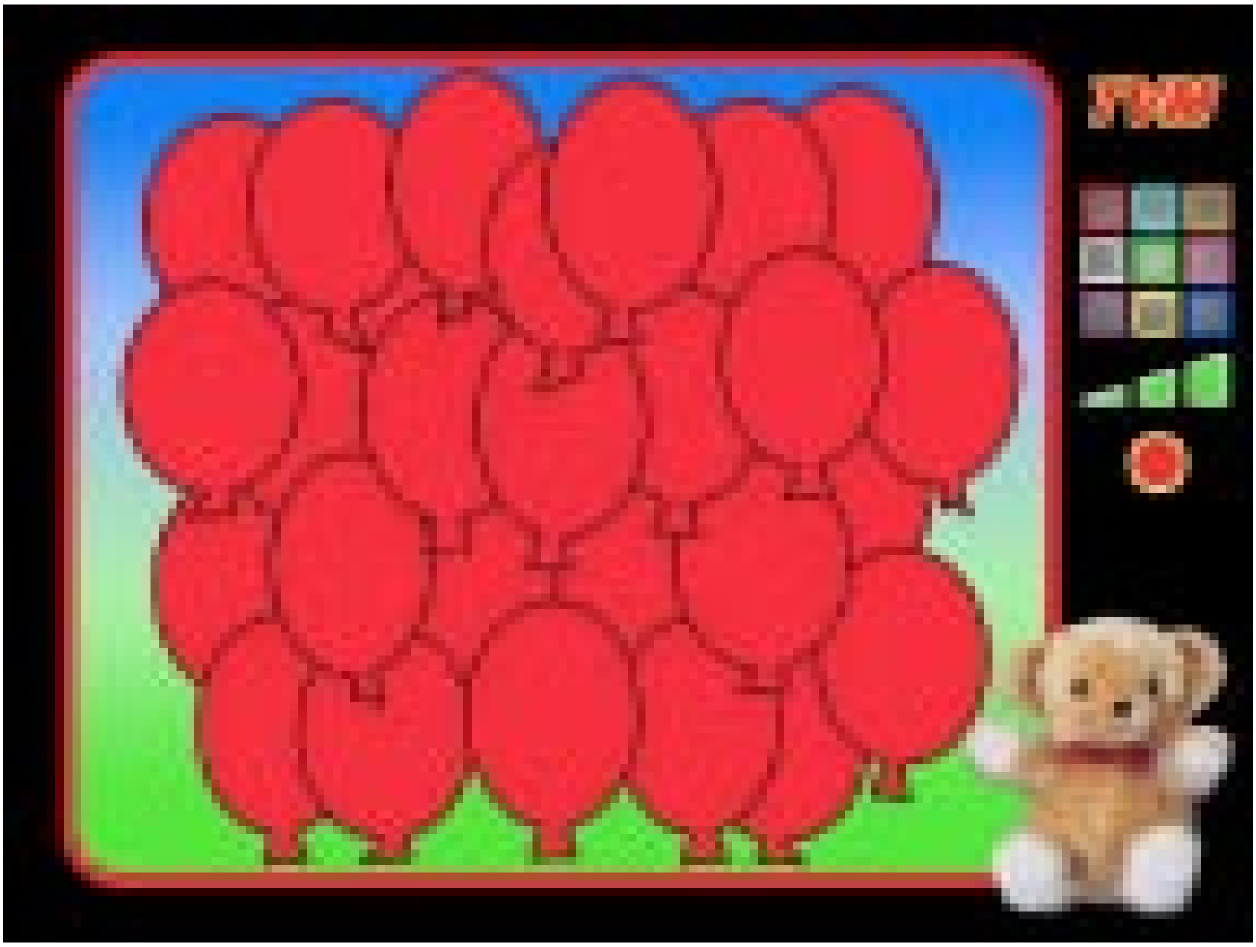


Figure 1:
A screen capture of the balloon popping activity.

the form of data collection and analysis is deemed the “legitimate”, and therefore “authorized” form of research.

2. THE “TVM” PROJECT

2.1 The Artefact

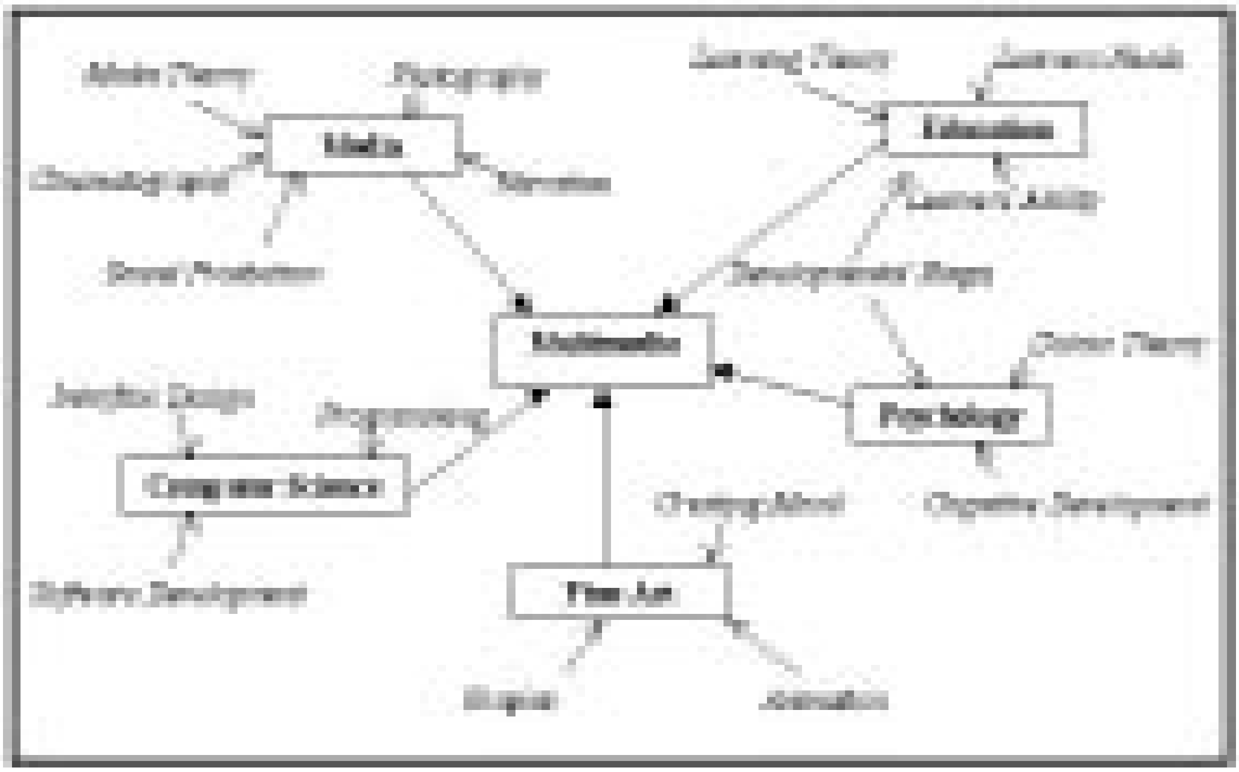
The artefact developed during the research process was called “TVM” with a system metaphor of a television that guides the young children in their interactions. Based on a television control panel, “TVM” consists of nine activities that are designed for two and three-year-old children to undertake both self directed and mediated exploration. The activities include balloon popping, peekaboo, old mac donald, felt pictures, a sing along, colouring book, three part book, ball sort and paint sort. Each of the activities was designed to be; age appropriate, progressively introduce new skills, use a range of metaphors that young children can interpret and provide a mixture of “drill and practice” and “open ended” activities.

The metaphoric mappings of both the activities and the system metaphor were considered during the design process. Metaphors have a particularly important function in interfaces for young children as other standard methods of communicating the purpose of an activity such as menus or command lines have limited use in applications for young children, as many have not yet acquired the ability to read. Thus the demographic constitution of the audience constrained the development of the metaphor to one that could feasibly perform the majority of the communication within the interface, particularly in guiding interactions. Creating interfaces for young children presents particular challenges. As previously mentioned, not only is there the constraint of limited literacy and numeracy to contend with but young children may not have experienced exposure to computers and thus are not aware of conventions used in computer interfaces. The designer/developer is thus compelled to avoid reliance on ether of these skills traditionally expected of the user.

2.2 The Findings

The research findings can be catagorised into two main areas. They relate to topics researched via traditional methodological formats. These topics included the relationships between young children, computers and metaphors. The findings highlighted the necessity for requisite knowledge and ability within that triadic relationship in order for young children to be enabled in their competent use of computers. The project found it necessary to introduce complementary elements to the metaphor in order to communicate the functional intention of the interface. An example of this is the introduction of an attachment/transitional object to undertake the role of mediator in order to support the young child and, concomitantly, to function as a help facility.

The second area of findings is in relation to the experiential knowledge gained via the production process. The artefact is the result of compromises made between conceptualization and implementation due to the limitation imposed by technical and production variables. The areas highlighted during production included; a model of development as a problem solving process, the value of a team in the development process and the advantages of having feedback at each stage of production. Other findings particularly related to production included the process undertaken during development and the issue of file management and backups. The process of creating the artefact enabled a greater level of understanding of the issues involved in design due to exposure to many complex variables. Issues were raised that a purely theoretical approach may have overlooked such as the limitations imposed by new technologies.



[Figure 2:

Multimedia and its relationship to other disciplines.

3. THE CONTEXT FOR CREATING AN ARTEFACT AS RESEARCH

Creating an artefact as a research project in computing is a novel concept in information technology yet has strong roots in several other disciplines. Disciplines such as the fine arts and engineering have a long tradition of using the creative process and the resulting product as a valid area of research. Working in multimedia is an extension of, and a collaboration between, a number of fields including media, computer science, education, and psychology thus research in this field will conceivably cross traditional boundaries and borrow techniques from all of the disciplines it incorporates.

Research methodologies in information technology are often limited to data collection and data analysis as both are seen as objective and free of the humanistic foibles of social and qualitative research. However it is inappropriate in many fields to restrict the collection of knowledge to this single method. Research in the scientific community necessarily suffers if restricted solely to data collection and analysis as this imposes limits on the knowledge potentially gained through research. Incorporating the design and development of an artefact as a valid research method increases the scope of knowledge that can be acquired and explored and the research questions that can be answered.

4. THE THEORETICAL PERSPECTIVE FOR CREATING ARTEFACTS AS RESEARCH

Creating an artefact as research utilises qualitative research methodologies documenting and exploring detailed elements as opposed to the collection and analysis of quantities of data. There are two facets of research addressed by invoking the process of artefact creation. The first is the exploration of a particular area or topic in a high degree of detail and the formulation of more precise questions for further research. For example, with the “TVM” project, existing research on young children’s computer use and on the use of metaphors in interface design were plentiful, however no apparent connection between the use of interface metaphors with this particular demographic. The “TVM” project explores how these two areas of knowledge can be drawn together. The second facet of research undertaken by the production of an artefact is the description of an area of research in a high degree of detail. In developing an artefact from inception to implementation every detail of the design and development is considered providing detailed information of a highly specific case. The “TVM” interface describes an interface theoretically suitable with which young children can interpret and interact. Each element of the design is considered with regard to its suitability for young children and the ways in which the metaphor functions.

Designing is a deductive process that begins with developing a logical relationship among seemingly disparate concepts and then building the artefact premised on the abstract concepts in order to create a concrete entity. The artefact generated via this deductive process is highly structured in order to fit within the framework of existing theory and each element is designed with careful consideration of both the theoretical and overall objectives of the project. For example, in “TVM” each activity is designed with an underlying foundational premise on the use of metaphors in interface design however, it is also matched with accepted and appropriate guidelines for the use of computers with young children and any specific considerations that need to be taken into account.

The production of an artefact is consequently to be deemed an aspect of applied research as it takes a particular area of knowledge and applies it to a very specific case. The case study provides valuable detailed data regarding one particular application. It cannot provide definitive results however, it documents a process that may be used as a model for the design of subsequent work. For example, in “TVM” the system metaphor utilised is a television. The process used to select the metaphor included brainstorming a number of possibilities, assessing the merit of each case, deciding on the metaphor to be used, documenting the metaphoric mappings, describing the interface and listing any problems that could be encountered. The subsequent metaphor selected is one of a variety of appropriate choices. The important component is the process used to determine the selection of the metaphor as it could be applied as the foundational methodology for the design of similar system.

One of the advantages in the production of an artefact is that the resulting product may then function as a testing vehicle to ensure the materialization of the abstract into the artefact thus achieving the intended purpose. This artefact could then be seen as the first element in a broader research framework. The design and development of the artefact solidifies/concretises the abstract conceptual framework; this initial work may then be molded to form the basis of inductive work to substantiate the theory with quantitative data. Thus, the exploratory nature of this research yields results that may be used as a springboard for future research.