Nov 17th, 12:00 AM

Towards 100 Actions for the 100 Languages of Children: The Use of Ethnographic Methods and Participatory Design to Enable an Investigation into Children's Learning Using Tangible Media and Digital Technologies.

Frank Feltham
RMIT University

Towards 100 Actions for the 100 Languages of Children: The Use of Ethnographic Methods and Participatory Design to Enable an Investigation Into Children's Learning Using Tangible Media and Digital technologies.

Frank Feltham

RMIT University

The objectives of this research will be to gain an understanding of the effectiveness of methods such as Participant Observation and Participatory Design in assisting the creation of designed prototypes for early primary school children's learning with tangible media and digital technology.

The interface between children and ICT has been a topic of discussion within the Human Computer Interaction (HCI), Education and Interaction design research communities. It has become apparent that the interface needs to foster and stimulate children's learning with technology. A way to achieve this would be to create tangible physical interactions that encourage greater engagement than the conventional Graphical User Interface (GUI).

Glos talks of the need to create a more familiar and less intimidating atmosphere for children with soft stuffed toys as an alternative to monitor and keyboard interface (Glos and Umaschi 1997).

Ishii talks of the interactions we have with these GUIs are separated from the ordinary physical environment within which we live and interact (Ishii H. 1997).

The learning I talk about here is "creative learning". To elaborate, creative learning is children expressing their understanding of the world through activities initiated by them. To this end my site of inquiry is a Reggio Emilia early primary school. The Reggio Emilia approach to early primary education uses Negotiated Learning (Forman and Fyfe 1998) which values topics initiated by the children and the encouragement of the100 languages of children (Edwards, Gandini et al. 1993) to express these topics such as drawing, making and creating narratives.

The Research Method and Techniques

A major source of the information will be gathered by means of videotaping and photographing children playing in their classroom with both existing toys, tools and technologies (Stage 1) and designed technological prototypes (Stage 3). A simple informal interview will also be used to establish their use of computers and other information technologies in the home. To pick up where an interview may fall short due to the children not being able or willing to verbalise their experiences with ICT, a designed series of cultural probes and Generative Tools (Sanders 2000) will be used to gather these responses.

An informal interview will also be conducted with their teacher and parents to gain a further understanding of their curriculum and activities.

Data gathering techniques therefore will involve, informal interviews with the teacher, the group of children and their parents. An observational journal, still photographs and video-recording. Cultural probes and Generative Tools (Sanders 2000) will also be used in the stage 1 observations.

Finally these observations from Stage 1 and 3 will be interpreted, compared and evaluated against key Reggio Emilia learning objectives.

Towards 100 actions for the 100 languages of Children;
The use of Ethnographic Methods and Participatory Design to enable an investigation into children's learning using tangible media and digital technologies.

Abstract

This paper takes a look at the opportunities Ethnographic methods including Participant Observation and Participatory Design offers for a context based research into children's creative learning using tangible media and digital technologies.
The intent of this paper is to discuss the study design in terms of its method and intended outcomes. This paper will also discuss some of the issues that have arisen as a result of the study of design of products and services in the information age. The title of the paper refers to the book "The 100 languages of children" (Edwards, Gandini et al. 1993) which documents the Reggio Emilia early childhood education method which I will be using as an educational context for my investigation.

Background

Ethnographic research, valuable information for design.

It is becoming commonplace in design projects to see Ethnographic research providing information leading to questions and design providing answers. This research is located within the tradition of gathering information about people and culture. It is valuable for designing because it liberates the design team with the knowledge of whom they are designing for and what they value and desire.
This is put simply by Philips Design as they discuss the relationship between research and design as being, researchers primarily focussing on values and the needs of people, whereas designers translate needs into benefits and develop solutions to address these needs. (Bueno 2003)
Sanders (2002) also states that designers and social scientists will need to work together. Social Scientists bring frameworks for the understanding of user experience to the table, while designers know how to synthesise and embody ideas and opportunities.

Methods of gaining information and inspiration from users.

The paradigm of Design Research is evolving to include methods from the social sciences. Considering this, the opportunities to inform the design project through these methods are overwhelming.
The problem that I have encountered is that there are many approaches and interpretations to research within the social sciences. This makes it difficult to distinguish what method or mixture of methods to use.

The advice I have been given is to be pragmatic and chose the method that is most relevant to the project
Therefore, how do I gather information about physical and social interaction and experience from a group of early primary school children?
Getting knowledge about a user experience seems to rely on creating or simulating that experience. Given that the investigation is looking at possibilities for physical interactions and experiences with digital technologies, a way to simulate this experience would be to have the children play with props and prototypes.

In the Mixers project (Beuno 2002) The authors used Participatory Design to gather valuable information about the experiences aged people had with a designed electronic noticeboard system. This resulting system was shaped by a variety collaborative activities using participatory prototypes, video scenarios and working mock-ups. The aim of using these tools was to "open up the design process to user input as much, and at many levels, as possible. (Beuno 2002)
The result of the simulations of interaction sequences and events with these prototypes and interaction props was a solution that was sensitive to the users their context and site of use.
I intend to use a similar methodology with my study with the difference being that my users will be primary school children within a Reggio Emilia program.

The project

Introduction.

As mentioned, I have chosen to conduct all of my observations and participations within a school that runs a Reggio Emilia program. The children will be purposively sampled by their teacher and will be ages 5 and 6. the sample group will number 4 to 5 and will have worked together on various Reggio activities. The project will be completed in stages to enable observation and reflection throughout.

Reggio Emilia an approach to learning

I have chosen Reggio Emilia as the educational method of focus for this research because it places value in developing the expression of children through their own creative means.

Reggio Emilia is an approach to learning that seeks to develop a child's knowledge and creativity through project-based activities with strong emphasis placed on project based learning, socialisation and peer based learning.

These activities involve topics that are already familiar to the children so as to encourage the child's own input rather than knowledge that they would have to seek from their teachers and others as the founder of Reggio Emilia, Loris Malaguzzi articulates,
When the topic of the project is very familiar to the children, they can contribute to the project from their own knowledge, and suggest questions to ask and lines of investigations to pursue; the children themselves can take leadership and planning, can assume responsibilities for specific observations and for information and artefacts to collect. Such projects investigating real phenomena offer children the opportunity to be the natural anthropologists they seem born to be.(Edwards, Gandini et al. 1993)

Another value of project work is that extended studies of particular phenomena undertaken in project work give young children an early experience of knowing and understanding a topic in depth.
(Edwards, Gandini et al. 1993).

The research method and tools

A major source of the information will be gathered by means of videotaping and photographing children playing in their classroom with both existing toys, tools and technologies (Stage1) and designed technological prototypes (Stage 2). A simple informal interview will also be used to establish their use of computers and other information technologies in the home. To pick up where an interview may fall short due to the children not being able or willing to verbalise their experiences with ICT, a designed series of cultural probes and Generative Tools (Sanders 2000) will be used to gather these responses. An informal interview will also be conducted with their teacher and parents to gain a further understanding of their curriculum and activities.

Data gathering techniques therefore will involve, informal interviews with the teacher, the group of children and their parents. An observational journal, still photographs and video-recording. Cultural probes and Generative Tools (Sanders 2000) will also be used in the stage 1 observations.

Stage 1- Preliminary observation

This will involve observing the children using traditional media and techniques for both playing and completing educational exercises.
The aim at this stage will be for me to understand the pre-school environment and just how the Reggio Emilia educational theory is put into practice. It will also inform me of what materials and facilities that already exist and how successful they are.

Stage 2- Design and construction of simple tangible prototypes

Based on the observations gathered in stage 1, a series of tangible prototypes will be created to enable an extension of the activities the children undertake within their learning and playing. These prototypes may be integral to existing games and activities. The prototypes may also be linked to existing

technologies such as laptops and digital projectors to simulate the activity as near as technologically possible.
The prototypes will use the principles of Tangible media to privilege physical interaction over the more passive interaction children will have with conventional computer interfaces (GUI's).

Stage 3- Observation of children using the tangible prototypes.

This stage will involve observation of the children using the designed tangible prototypes to gain an understanding of the peer interaction and group dynamics in relation to the new prototypes. Also to evaluate whether the prototypes add to the learning experience of the children within the Reggio method.

The Criteria for the observation will include;

- Their immediate response to the introduced prototype
- Elements of subsequent exploration with the prototype
- The groups ongoing utilization with the prototype.
- Are the prototypes more tangible then conventional interfaces

Stage 4 - The analysis of data.

This stage will include an analysis of the data from the 1st and 3rd stage as a comparison against the observation criteria.

The analysis will also include

- Stage 1 observations from the journal and its use to inform the study.
- Informal interview information both from the children, teacher and parents.
- Videotape, Journal entries and Photographs in both the 1st and 3rd stages.
- Analysis of responses to Cultural Probes and Generative Tools.

Expected outcomes from the research

This study is aiming to determine responses and come to some conclusion as to whether there is any noticeable difference in the use of digitally augmented tangible interface over conventional drawing and craft activities used in the Reggio Emilia primary school as part of their curriculum. The comparison of tangible interface and conventional computer interface (GUI) will be a significant part of the analysis and evaluation.

ICT, children's expression and creative learning.

Whilst ICT enables some remarkable communication advantages and allows us to perform many tasks with great mathematical accuracy. The interface that we have with the keyboard screen and mouse make immense assumptions about who we are as humans and more particularly young humans.

Take for example children drawing. They have a direct physical connection to the pencil and the paper with their expression being uninhibited, relying on the gesture of the scribble and stroke to express any number of concepts they have of the world. Since the child's main urges during scribbling are to identify with motor activity, the material used should encourage free expression of kinaesthetic sensations without any intruding technical difficulties. (Lowenfeld and Brittain 1966)

The Graphical user interface, keyboard screen and mouse do not allow for this physicality and expression. Nor the development of motor skills drawing affords.

Tangible media a bridge for the gap between creative learning and ICT

The aim of the research followed an interesting trajectory when I questioned the physical interface of the computer and its appropriateness for children and creative learning. As a design educator I had seen first hand the implications of my students attempting to design with computers and 3 dimensional modelling software and certain parallels can be drawn from their experiences to those in pre and primary school education. The act of designing was limited to a largely cognitive exercise (mathematical and spatial) to enable a computer to "build" a virtual model of a design proposition.

When using such software tacit physical skills such as drawing and making were disregarded and value was placed on the mathematical logic of the computer program. The students often felt compelled to comply with this logic and would make design decisions in compliance whilst sitting in front of a computer screen. Our response was to ensure that the students had 3 dimensional mock-ups to reference whilst they were using this computer modelling program. But one could argue that the software had failed the design process, or the design process as we know it as a truly physical and spatial activity.

The Tangible Media Lab at MIT, ID Studiolab at TU Delft, Designed Intelligence group at TU Eindhoven and the Interactive Institute IVREA all consider the graphical user interface (GUI) to lack the rich physical interactions we as humans are used to. Each of these groups challenges the incapacity of the GUI to enable a meaningful interaction. What is interesting with their approach for this research is the experimental projects that challenge and extend these interactions.

Streams of bits leak out of cyberspace through a myriad of rectangular screens into the physical world as photon beams. However, the interactions between people and cyberspace are now largely confined to traditional GUI (Graphical User Interface)-based boxes sitting on desktops or laptops. The interactions with these GUIs are separated from the ordinary physical environment within which we live and interact. (Ishii H. 1997)

Tangible Media for the purpose of this research will be defined as objects that enable a more meaningful interface with children and ICT for the purpose of extending their creative learning.
The interface between children and ICT has been a topic of discussion within educational research. It has become apparent that the interface needs to foster and stimulate children's learning with technology.
It is important, especially as a part of an effort to support children's emotional engagement in computer-based activities. Incorporating soft stuffed toys as an alternative to the traditional monitor and keyboard interface seems to create a more familiar and less intimidating atmosphere for children.(Glos 1997)

POGO a tangible media storytelling system

Nicola Yelland talks about the nature of the toy changing with the Advent of new technologies which have the effect of bringing additional dimensions to objects that had previously been passive (Yelland 1999).

With POGO by Philips Design (Aarts E. 2003) children are encouraged to create multimedia stories that combine still image, recorded sound and moving image of their own narratives. The nature of the interface has changed significantly in that with POGO the children are in total interactive control over this creative storytelling experience. This experience is also a collaborative one where the children work together which is encouraged due to the size and flexibility of the tools the children play with.

The Mumbo, Camtable and Soundmat (Aarts E. 2003) encourage a physicality beyond the usual clicking of the mouse and keystroke actions we have with traditional GUI's. If we were to also compare this to a conventional on the market children's toy that encourages creativity such as the Doodle Pro™ magnetic drawing pad or plasticine modelling clay we see that the creative experience only takes place with passive media and interaction is limited.

1

[1] Image, Mumbo, Aarts E., M. S., Ed. (2003). The New Everyday. Rotterdam, 010.

POGO encourages a story to be expressed with multiple media thus extending the study of what is drawn and made into the creation of a short film. The way the technology is presented with the POGO interface encourages interaction and adds dimension to conventional passive media creative toys. It also encourages certain Reggio Emilia principles such as collaborative learning, project based activities and knowing and understanding a topic in depth.

3

2

Conclusion

Thoughtful design of products and systems for Information and Computer technology create new concerns for designers and researchers developing them. These include the appropriate physical representation of the tools that create a meaningful interface with digital information systems and attempts by designers to enable an experience the user will deem desirable with both the physical and non-physical elements of these systems.

---

[2] Image, Camtable , Aarts E., M. S., Ed. (2003). The New Everyday;. Rotterdam, 010.

[3] Image, Camtable, Soundmat, Aarts E., M. S., Ed. (2003). The New Everyday; Rotterdam, 010.

Given that this projects user group are early primary school children. To understand and thoughtfully design for this age, a context specific ethnographic study is needed with techniques such as cultural probes, Generative Tools (Sanders 2000) and tangible prototypes to simulate these experiences. The children with their actions and responses to these research tools become partners in the research and design process providing rich observations upon which analysis and conclusions can be drawn.

Bibliography

Aarts E., M. S., Ed. (2003). The New Everyday; Views on Ambient Intelligence. Rotterdam, 010.

Beuno, M., Maze,R. (2002). "Mixers a participatory approach to design prototyping." DIS 2002.

Bueno , M. R., L (2003). Understanding people in new ways, Personas in context: forging a stronger link between research and its application in design. Proceeding Ensomar 2003.

Edwards, C. P., L. Gandini, et al. (1993). The hundred languages of children : the Reggio Emilia approach to early childhood education. Norwood, N.J., Ablex Pub. Corp.

Glos, J., & Umaschi. (1997). Once Upon an Object: Computationally-Augmented Toys for storytelling. ICCIMA ’97.

Ishii H., U. B. (1997). Tangible Bits: Towards Seamless Interfaces between People, Bits and Atoms. CHI '97,.

Lowenfeld, V. and W. L. Brittain (1966). Creative and Mental Growth, The Macmillan company.

Sanders, E. B.-N. (2000). Generative Tools for Codesigning. Collaborative Design. B. a. W. Scrivener.

Yelland, N. (1999). "New ways of Playing: Digital Toys for the new millennium."