PLAYING IN THE PARK: OBSERVATION AND CO-DESIGN METHODS APPROPRIATE TO CREATING LOCATION BASED GAMES FOR CHILDREN

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A series of co-design activities were carried out in response to a 'real world design problem' initiated by the Sussex Wildlife Trust. Investigations were focussed on how technological interventions could encourage outdoor play for older children (aged 8-12) who were less inclined to attend holiday clubs in the countryside than younger children. Studies have shown that spending time outdoors during formative years will encourage visits during adulthood and promote environmental awareness. The focus for the work was on developing participatory techniques for this age group that improve communication with adult partners and encourage creative thinking. In particular the use of character and story design activities facilitated open discussions about their preferences and opinions and avoided the constraints of a real design problem. Methods for this age group were adapted for the 'Say', 'Do', 'Make' method of triangulating data (Sanders, 2001). The children helped to co-create a series of Location Based Games that provided a useful design template for further development of the concept.

Introduction

The following paper describes research carried out to address a real world problem posed by the Sussex Wildlife Trust. The question was "How can we use technology to motivate older children to play outdoors and appreciate nature." According to authorities on the subject, e.g. the Sustainable Development Commission, an appreciation of nature at a key age can lead to greater enthusiasm for environmental issues and encourage people to engage more fully in a sustainable society (Sustainable, 2009). There is also evidence that visiting the countryside at an impressionable age leads to a lifetime habit of enjoyment (Natural England, 2009). Young pre-teenagers can present a challenge however as, by this stage, many become less interested in outdoor play than might be desired, and typical activities organized by the trust, e.g. den building or digging for bugs have been less popular with these older age groups. Interest in digital media is relatively common, however, and can provide a key channel to access learning about the environment and biodiversity. Varied research projects have been carried out to consider how different technologies can influence location based learning about the outdoors, particularly for scholastic activities (Yvonne Rogers, 2010). However, frequently these studies are focused on functionality and how the technology could improve interaction and data storage (Druin, 1999a). There is less emphasis on why the young person might wish to cooperate in such activities in the first place, or how it might be made more enjoyable.

There has been considerable interest in the use of computer games for learning due to their powers of motivation; it is generally accepted that computer games have great capacity to engage young people. Williamson found that 87% of 8-11s played games on a console at home in the UK (2009). Games can simply be fun, but by their nature usually include a system of rewards and recognition of success or effort, which can be highly motivating. For this context, because the outcome is outdoor activity, a 'Location Based Game' is likely to be the most appropriate model for the investigation. There are a series of subcategories of play in this area, for example digital Geo-cashing, where the player tries to find artefacts in a particular place that have been left by fellow players; Treasure Hunts where players look for information or carry out tasks in a given place, and more social gaming versions where proximity to other players is automatically registered and interactions are a game feature. For the purposes of the project the activity will be based on specific locations due to the subject under study.

Previous research had indicated the significance of characters and stories to children, so the game was also intended to use this vehicle to add a narrative to further improve the motivational properties of the game.

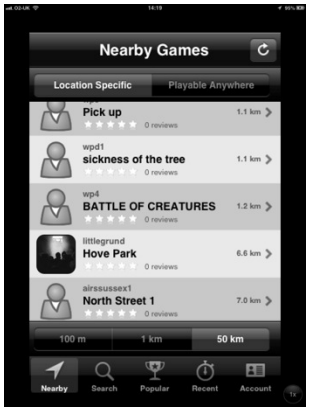

Figure 1 ARIS Game Menu

After a literature review of appropriate forms of technology, it was considered that a phone or I-pad based APP was likely to be most accessible medium to further investigate the play requirements. From the possibilities studied, ARIS, a relatively user-friendly open source platform for creating and playing mobile games was selected. It provides a relatively simple web based, Flash system for making tours, treasure hunts or adventure games with stories that children should be able to use. Further use of an APP called Morfo was introduced as a simple way for the children to create video to project the narrative and characters from their drawings or natural phenomena.

Figure 2. Childs drawing animated with the Morfo App

Rationale

The nature of a 'Real World Problem' usually calls for a flexible methodology and methods that are participatory and inclusive. Due to the complex nature of the issues involved, with a range of stakeholders and questions that evolve in specificity over time, a variety of different methods will be required, including Action Research, Ethnographic studies and a Participatory approach to development of ideas. The approach here is analogous to Design Based Research, a methodology frequently applied to research that relates to the development of learning tools, however fun and motivation are more significant than imparting knowledge for the project aims. Research for a design outcome can be considered a methodology, according to Buchanan (1992), if it is properly validated during the process. An aspect of the literature review towards this project has therefore been focused on finding appropriate techniques to investigate the requirements of this group with interrogations that are age appropriate and can be 'triangulated' to get valid data, including Participatory and Co-Design methods.

Which Participatory Design Method?

As an adult it is almost impossible to second-guess the preferences of an 8-12 year old child. (Naranjo-Bock, 2011) According to Mazzone et. al. (2010) "Children's ideas should be harvested appropriately when designing for them since they observe and perceive things differently compared to adults". The work of Alison Druin (1999b) and many others also illustrates the significance of including children in a design process at all stages. However, gathering *useful* information for innovation can be more difficult than for adults. Not only do children have different needs, behaviours and motivations, they also communicate in a different fashion. In other words, the difference in perception and culture between children and adults can lead to errors in interpretation during the process. Traditional participatory methods therefore need to be modified in order to compensate for typical differences in cognitive development in order to gain useful results. However, Obrist et. Al (2011) stated that there is still a profound lack of knowledge of how to involve children in the different phases of a product development, in particular the early conceptualization and evaluation.

Elizabeth Sanders was one of the early pioneers of Co-Design techniques and part of her work while at Sonic Rim was to invent and apply the 'Say, Do, Make' model (Sanders, 2009). '**Say**' represents techniques that explore verbal information gathering, for example through questionnaires and interviews. Traditional forms of market research rely on verbal communication between people, i.e., on what people say. The "say methods" are useful for getting an idea of what people can and want to tell you in words, but they can be limited in predictive terms. '**Do'** represents observational techniques, like Video ethnography. These are useful but in many cases quite time consuming, often requiring extensive note taking, editing and analysis. **Make** describes more projective methods that involve creative techniques with the user, including co-designing. Sanders' work provides a semantic and practical categorization of the variety of methods available. An ideal situation would be a triangulation of information from all three **Say, Do, Make** categories. This project includes an attempt to investigate how we can apply the *Say, Do Make* tools for triangulating data.

Children as Design Partners

One of the more obvious reasons why 'Say' tools can be impractical for younger children is their relative inability to verbalize their responses. Methods that rely on description and memory are less likely to yield fruitful results, in either written or spoken form, than some alternatives. 'Do' tools are based largely on the observations of the design researcher and therefore a certain amount of interpretation is required. A child's world seen through adult eyes is open to misinterpretation and needs to be triangulated and tested against other results. Of the three approaches the 'Make' tools seem to fit with a child's ability and engagement most successfully. Despite skepticism in some quarters, Garzotto (2011) suggests that beyond the traditional roles of children as users, testers and informants, children are highly capable of being Design Partners and taking a more creative role. Alison Druin is also a proponent of including children as active designers through a process called 'Cooperative Inquiry' This also includes children as observers and researchers of others besides being arbiters in the design decisions (1999b). Creative activities rely less on language and memory, which in childhood are less developed skills: Secondly, creative activities appeal to a child's imagination and this is one of their main assets. In the words of Vaajakallio et al. (2009) 'Children were motivated or even enthusiastic with the Make tools.'.

Bridging the Conceptual Gap

Cognitive Psychologists have shown that children find it difficult to conceptualize ideas that are abstract in nature (Gelderblom, 2009). Design problems at the beginning of a development process require 'blue skies' thinking about new artefacts whose form cannot be pre-defined and therefore may appear intangible to a child. Activities that involve defining a final design outcome may not be tangible or understandable to a child. Methods that avoid the constraints of the design problem directly simplify the task. Storytelling and storyboarding have been used as co-design methods to enable both adults and children to communicate in an accessible form (Ryokai, 2012) However the stories are usually about the user as the narrator and encourage them to tell their own story. Earlier experimentation has shown that a process involving the creation of stories and characters can provoke conversation and also presents useful insights into the world of the child (Grundy, 2012). Frequently their preferences and, in some cases, personality are expressed through the designed character and their adventures. Characters and stories both represent a familiar subject area for both adult and child. Characters are practically an

everyday part of a child's life and they certainly have affection for them. They are also frequently used by counsellors to gain information from children in a sympathetic fashion. Thus the initial stage of the project involved creating characters and stories around the subject. These would later be relevant to the pupils designing the outdoor game, having been informed by the activity, however they also allow clear communication between the different members of the design team and provide information for later design efforts.

Methodology

A literature review had already been carried out to identify suitable technologies, games software and participatory design methods. Interviews with a series of wildlife experts and further study of environmental issues had also informed the experiments. The investigations with children were organized into two phases across two different schools. Phase 1: The project started with two school classroom visits, to St. Andrews school in Hove, in each case with a group of thirty pupils aged between 9 and 10. One group were asked to create characters and stories around their favourite natural subjects, the other were asked to create game scenes using their favourite natural subjects. (both relate to Sanders 'Make' methods) This was done to compare results in terms of use of information for the game and how understandable the activity was. They were also asked to complete an online survey that related to their habits for outdoor play ('Say' methods). Phase 2: A group of twelve pupils from Fairlight primary school, aged between 10 and 11 were asked to design a Location Based Game for a local park over a five week period. The pupils worked in groups of three during the project. Week 1 they were taken to Stanmer Park and at specific locations, asked to take images of what they considered interesting phenomena. This was done from inside the ARIS game environment, so that the points were geo-tagged and ready to be used in the developing game. While one pupil had an I-pad, another took video footage of the experience and the third made notes. During week 2, the pupils were introduced to the concept of location-based games and worked with the ARIS interface. For week 3, Character Designs and Stories were developed for the game scenes. During this process the conversations were observed and recorded. In week 4, the games were further developed and videos created of natural objects in Morfo. Eventually in week 5 the pupils played the games outdoors in the park and again one member took video of the experience.. Four successful games were eventually produced.

Results

For Phase 1, evidence for games characters and suitable game scenes was successfully gathered for both groups. The activity also provided a good discussion opportunity with group facilitators to find out more about the children and their preferences for the context.

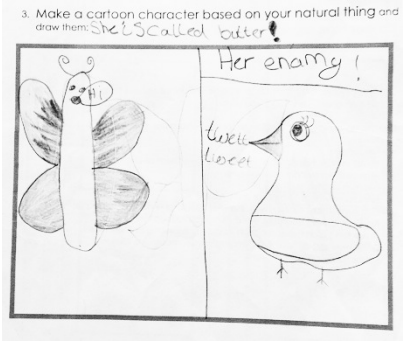

Figure 3 Friend and Foe characters

Sometimes, pupils who were asked to create games resorted to copying other known games (one example is illustrated in fig 3) and in some cases were confused about what the required outcome should be. This yielded further evidence that the character design and story activity is preferable to a request to provide potential game designs. Nature and creature preferences were also identified, e.g. squirrels, rabbits etc. were preferred, slugs and bugs were considered 'the baddies'. More broadly the activities helped to identify key properties and themes of the game, for example social aspects like parties with friends were a common theme, typical power games like defeating evil and so on. The survey helped to put the pupil's interests in a broader context.

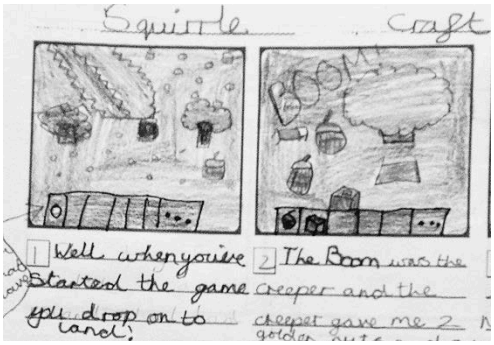

Figure 4 Game design similar to existing examples.

During Phase 2: The pupils all managed to successfully create a playable game, however evidence indicated that they were more interested in playing their own games than each other's. It was noted by all of the adult participants that it was difficult in the timescales for the children to produce a game that coherently communicated its goal and the tasks in hand. This suggested that either more time was necessary, or that the results should be interpreted in a more participatory fashion, to provide information for further development by the designer at a later stage for testing with the children. The character design and story co-design activities for this phase also provided a useful basis for deciding the content of the game characters and their activities. The videos and observations by group members helped to identify game characteristics, e.g: The distance between points should not be more than 30 metres or children lose focus and get distracted by other features, directional clues and illustrations of the next point should be provided as map reading is difficult for this age and sometimes frustrating. All design conclusions are too many to detail here.

Conclusions

The character and story design method, provided an excellent opportunity to discuss ideal preferences with children without the technical constraints of the design problem. The game creation co-design activity itself generated useful data but would need further development from a design expert to create communicable games to others. The methods chosen, when added to the ethnographic observations and survey results were effectively triangulated using the Say Do Make method.

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