Experiences in Ethical Usability Testing with Children

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ABSTRACT

This paper describes the issues in conducting ethical usability testing with children including experiences in developing and testing sign language software on Kindergarten, Prep and Grade five and Grade six children. It considers the unique requirement of researching with children and the process of gaining university approval to conduct research with children. It discusses the difficulties in gaining informed consent from teachers, parents and children, protection of the research subject from harm and the difficulty in empowering children to instigate their right to refuse to participate in the research project. The article also discusses practical issues such as age appropriate practice, the duration of testing and recruitment of participants. Each issue is disused in theory and an example is given from a resent research project Auslan Children.

INTRODUCTION

Auslan Children was a series of research projects that were undertaken to develop high quality software to teach hearing children sign language. There is currently little research specifically in the area of using software to teach young children Sign Language. The target age of children for the first project was four year old children in a kindergarten setting. The target age of the second project was five and six year old children who were in prep at primary school and eleven and twelve year old children who were in grade five and six at primary school. The *Auslan Children* software consisted of direct instruction of Australian Sign Language (Auslan) by three different characters: a female presenter; a super hero and a puppet. The next section of the software had three activities a short story, a song and a game.

In order to develop the best software for learning it was important to take children's preferences into consideration this included researching the most preferred character for presenting new signs, the type of activities that the children liked, the number of sign that children were able to remember in a single session in addition to the differences that age and gender made to the children's preference. The research project ran a number of small scale iterations in order to limit the amount of time spent on non preferred options.

The research was conducted in the context of university research in which researcher was required to meet strict criteria specified by the institutions in order to protect the participants and the credibility of the research and the institution. Private organizations are not subject to the same procedures but should still be considering the following issues in order to protect the best interests of the participating child. It is important to conduct research with children as children can benefit from these activities and the findings from research conducted on adults cannot always be assumed to apply to children. According to the Australian National Statement on Ethical Conduct in Research Involving Humans, "Research is essential to advance knowledge about children's and young peoples' well-being" (2005, p. 4.1). It is by researching children that their voices can be heard and their preferences can be taken into consideration(Burmeister, 2001).. The children that participated in the research were considered valuable to the research as their preferences for learning could be considerably different to adult learners. Hedges states, "Views of children affect the content and process of the education they receive and ways they are researched" (2001, p. 1).

THE COMPLICATIONS PRESENTED BY RESEARCHING CHILDREN

Gaining data from children can be complicated by a number of characteristics that children may exhibit, although not exclusively characteristics of children they are more prevalent in this group. Read and MacFarlane state, "Factors that impact on question answering include developmental effects including language ability, reading age, and motor skills, as well as temperamental effects such as confidence, self-belief and the desire to please" (2006, p. 82). The language and conceptual concepts used in questions is really important to the results for example when children in prep were asked what their most favorite activity and their least favorite activity in *Auslan Children*, eight out of eighteen children (44%) selected the same activity for both showing they either could not make the selection accurately or they did not understand the concepts. False data may be collected if the children can make up answers in order to please the interviewer or if they tell the interviewer what they have been told by adults rather than giving their own opinion (Hedges, 2001). Therefore when it was possible to collect the same data
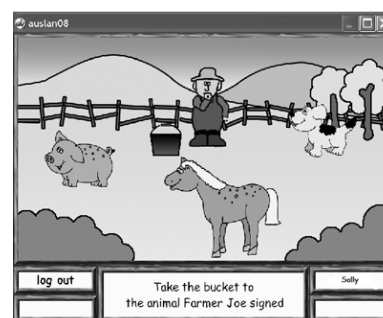
Figure 1. Direct instruction

Figure 2. Story

Figure 3. Game

from a number of sources this should be instituted. For example when collecting data regarding children's preference for characters between a female presenter, a super hero and a puppet the kindergarten children were able to work for one session with each character, in the fourth session they were able to select the character to take the session, when this preference for character was compared with the character that the children stated was there favorite 4 out of 15 children (26%) changed their preference dependent on the method of asking.

Another reason for using well trained researchers is that young children may have limited ability to express themselves verbally and the accuracy of the data is dependent on the researchers' ability to understand the children (Hedges, 2001). The presence of the researcher can affect the result, especially in the case of children. Read and MacFarlane state, "Even when there is no deliberate intervention the interview has an effect. In one study it was shown that children are likely to give different responses depending on the status of the interviewer" (2006, p. 82). Hedges states "Children behave differently with people they are unfamiliar with" (2001, p. 6). Even the actions of the researcher can effect the willingness of the participants to participate. For example when conducting research at a Kindergarten on using *Auslan Children*, children joined in making the signs with the software when the researcher was just watching, when the researcher had pencil and paper the children behaviour changed and they were less likely to join in at all. Also the presence or absence of a parent or guardian can significantly effect a child's behavior so careful consideration needs to be given to the physical research design.

GAINING UNIVERSITY APPROVAL TO CONDUCT RESEARCH WITH CHILDREN

The process of gaining approval to conduct research on children is quite daunting. At Monash University in Victoria Australia the form that needs to be completed to conduct research on children is twenty one pages, plus a privacy form needs to be completed which is another eight pages. In addition to this explanatory statements and consent forms for the staff, parents and children must be prepared. Written permission must be gained from any organizations involved such as kindergartens. If research is being conducted in schools there is an additional process of gaining permission from the government department of education, and the principle of the school prior to contacting the teachers, parents and students. Filling in the forms is time consuming, and forms need to be sent in three to four weeks before meetings of ethics committees with replies taking and additional two weeks. The main concerns for the Ethics committees seemed only conducting research in the best interest of the children, informed consent from the parents and children, and ensuring that participants are not coerced.

INFORMED CONSENT

The parents or guardians of children are usually required to give informed consent on behalf of the child until the child reaches the age of consent. The parent's or guardian's consent is gained as they are considered more capable of making a decision taking into account all aspects of the research (Hedges, 2001). Field and Behrman state, "informed consent is widely regarded as a cornerstone of ethical research. Because children (with the exception of adolescents under certain conditions) do not have the legal capacity to provide informed consent, the concepts of parental permission and child assent have been developed as standards for ethical research involving children" (2004, p. 7). The Australian National Statement on Ethical Conduct in Research Involving Humans states that consent is required from the "child or young person' whenever he or she has sufficient competence to make this decision" (Commonwealth Government of Australia, 2005, p. 4.2a) and also from the parent or guardian. Parents may only consent if the proposed research is not contrary to the child's best interest.

When research is conducted in schools, the lines of communication between the researcher and the parents are often more complex but acquiring consent from parents must not be compromised. In schools, consent must be obtained from all relevant parties including the child, the parent or guardian, the class teacher, the school principal and the relevant department of education. School staff cannot consent on behalf of students or parents nor can they disclose information for research purposes about any person or group without the prior permission of the individual affected. When sending forms out to children thought a school it is useful to provide a reply paid envelope for the parents to reply directly to the researcher, approximately fifty percent of parents responded in this way when provided with the opportunity.

PROTECTION OF THE RESEARCH SUBJECTS

Designing ethical research is difficult in educational settings as the nature of the experimental process applies different treatments to different groups, which has to disadvantage some groups. Hedges states, "In experiments a researcher ought to verify that children in the control group are not disadvantaged in relation to those in the experimental group who may receive new curricula, new teaching methods or new learning strategies" (2001, p. 8). There are also cases when the control group does not benefit from the treatment and this may be harm by omission (Johnson, 2000). Confidentiality of results can also be an issue as inadvertently revealing a child identity may lead to harm of the child. This may not be releasing a name but having such as small group that the identity can be deduced (Berk, 1997).

Children have the right to expect to be protected from harm in all research conducted on them. The Convention on the Rights of the Child states, "Bearing in mind that, as indicated in the Declaration of the Rights of the Child, "the child, by reason of his physical and mental immaturity, needs special safeguards and care, including appropriate legal protection, before as well as after birth"" (UNICEF, 1989). In addition to this Article 3 of the convention states, "In all actions concerning children….the best interest of the child shall be a primary consideration."

Protection of children in the process of research may not be as obvious as it first seems. If the results of the research is unknown, as is usually the case, then it is necessary to consider the research carefully to predict any harm that may come to children by participating in the research and if there is a possibility of harm then the research should not be conducted (Berk, 1997). For example, harm can be induced in children at different ages in ways that are not relevant to adults (Greenfield, 1984). Older children, for example, are susceptible to harm from procedures that threaten the way they think of themselves (Berk, 1997). People often don't see the value in ethics clearance for Usability testing because it in not medical research but there is unintended harm that can occur if research is not conducted ethically. Children's perceptions of computers could be damaged by participating in research and this could effect their decisions later in life. In addition children should not be made to feel powerless in the process of research so the right to refuse is of critical importance.

Australian National laws governing mandatory reporting of particular issues such as child abuse can pose a dilemma when conducting research. The procedures to be followed in the case of mandatory reporting should be clearly set out so that the researcher knows what their obligations are and the appropriate channels to follow (Newman & Pollnitz, 2002). In order to avoid any issues with this requirement the research on *Auslan Children* was conduced in open areas of the kindergarten and school in order to reduce the likelihood for possible incidence.

REFUSAL TO PARTICIPATE

Voluntary participation is a complex ethical area when working with children. The children may feel coerced into participating in the research if their parent or guardian has given permission even if they do not want to participate in the research. The child's right to refuse to participate in a research project must be respected (Commonwealth Government of Australia, 2005). The language and tone used by the researcher is important as there may be implied coercion when it is not intended. For example, if asking a child to use a computer the researcher could state, "Come and use the computer now" or use a more sensitive statement such as "Would you like to use the computer now". When children elect to participate in research they may change their minds. Hedges states "Children may choose, for example not to answer a question in an interview, or become bored or uninterested" (2001, p. 7). When conducting the Auslan Children research one child refused to take part in the research after the second weeks activity, rather than this being a negative reflection on the research it is a positive outcome that the child felt that they had the right to refuse to participate and was not force to by the researcher. Many children would occasionally refuse to participate because they were currently engaged in another activity the children would then come to the computer when they were ready to have a turn. The right to refuse to participate in a school situation is difficult as students are often not given this option in their normal school situation and may not recognise the right to refuse in a research context.

REPORTING BACK TO THE PARTICIPANTS

Once the research has been completed and analysed the knowledge gained by conducting research with children should then be released to the public (conforming

to the appropriate confidentiality provisions) in order to improve the circumstances of children and thereby justify the conducting of the research (Hedges, 2001). The participants in the research must also be informed of the findings. In the case of children, this should be done in a language that is appropriate to the age of the children involved (Johnson, 2000). The research for these projects was conducted over and extended period and this caused some difficulty in the ability to report back to the participants that were involved. For example when the research was conducted at the kindergarten the children are only involved with the institution for one year and then they move on to school. This makes it difficult to relay the results to the parents and children as to maintain confidentiality the contact details of the children may not be collected so it is not possible to send out the results at a later stage. The best ways to report back may be to make the results available through the organisation for example the kindergarten and also make the results available in a publicly accessible form such as on a web page so that participants and there parents are able to check the results once they have become available.

THE LOCATION OF THE RESEARCH

The location of the research is an important issue: should the researcher go to the children in a home or school setting or should the child come to the researcher? Usability labs offer iterative testing with changes between each test session but the children may not be as comfortable as in the home environment and not as many children can be tested as by testing groups within a school setting. For the experiments on children using the Auslan Software the testing was conducted in the Kindergarten or School. The Kindergarten was selected as it was an environment in which the children were comfortable and they were familiar with using the computer at the kindergarten. The research that was conducted at the school enabled the researcher to work in the environment for which the software was designed to be used in the longer term. It was important to test the likelihood of the software being able to be independently used by the target children in the future. As a result of the research for language learning software the researcher would recommend that any language learning software is loaded onto laptop and controlled by the language teacher to enable consistent control to be maintained over the software by an interested party this means fewer copies of the software could be loaded and maintained well. The three main methods of gathering data are observations, interviews and questionnaires (Hanna, Risden, & Alexander, 1997). One of the advantages with usability testing is that the computer can record some of the data independently such as time on task, response times and selection information in addition to results of testing. Automated data collection may need to be combined with observations is an effective method of collecting data on usability as some duration information may be misinterpreted if only the times are logged.

AGE APPROPRIATE RESEARCH DESIGN

The age of children involved in testing affects the style of testing that is appropriate to gather the required information (Ellis, 2002). Hanna, Risden and Alexander found that "most children younger than 2 ½ years of age are not proficient enough with standard input devices (e.g. Mouse, trackball or keyboard) to interact with the technology and provide useful data" (1997, p. 10). Preschool children should be able to explore the computer independently, however, when conducting usability testing preschool children require extensive adaptation to software because of their limited attention span. In comparison to testing pre-schoolers, elementary school children aged 6 – 10 are relatively easy to test. They can sit and follow directions, are not self conscious of being observed and will answer questions and try new things easily. Six and seven year olds like to be engaged in hands on activities but can be shy (Hanna et al., 1997). When conducting a literature review on two and three year old children the researcher discovered that there was little research on this age group as they are difficult to work with and it is hard to recruit significant numbers for research. This does not mean that research on this group is less important. Working with kindergarten children compared with children of primary school age is much more difficult. It is possible for children in there first year of prep to be shown how to use the software and then work independently, the researcher had to play a much more supportive role with kindergarten children which is time consuming but the competency that this age of child can achieve should not be underestimated.

DURATION OF THE TESTING

Hanna, Risden et al. (Hanna et al., 1997) believe that sessions should not exceed one hour of lab time as preschooler will last thirty minutes and older children will fatigue in an hour. When conducting user testing with children, it is best to select children who can already use a computer. Read and MacFarlane concur stating "Keep it short: Whatever the children are asked to do, make it fit their time span….. For young children, five minutes spent in a written survey is generally long enough, more time can be given, as the children get older" (Read & MacFarlane, 2006). When developing the software Auslan children there were several reasons for developing 10 minute segments such as this is the time that was currently allocated to children to use the kindergartens computer. Also there was concern that kindergarten children would be cognitively overloaded by longer sessions that were introducing new information. The ten minute sessions worked really well; in addition children that were highly engaged had the option of completing more than one session at a time.

RECRUIT OF REPRESENTATIVE CHILDREN

The recruitment of children for research must be considered carefully, as it is quite difficult to not recruit a captive audience through people that are known to the researcher or organisation and who have groups of children of the appropriate age. Hanna, Risden and Alexander (1997) warn against using colleagues' children for usability testing as they are far more exposed to computers than average children and if they don't like the software it can create situation where they feel uncomfortable expressing their true thoughts on the software. A university requirement for conducting research is that both parents and children complete informed consent forms. The explanatory statements for the *Auslan Children* projects were long in order to include all of the information required by the University, these forms are duplicated and combined make quite a thick document. At the start of many of the projects there was less respondents than ideal. Once the project has commenced and peers become aware of the project and want to participate, therefore forms were made available and many more research subjects signed on to participate in the project building a more acceptable number of research subjects.

CONCLUSION

Usability testing with children provides insight into the requirements of software developed for children and the way that they interact with the software however the design of the testing needs to be carefully considered to take into consideration the special requirement of the children. The university approval of research on children is a rigorous process that is designed to protect the best interest of the child and to ensure that the parent and children consenting to participate in research that they are adequately informed about. Careful consideration needs to be given as to the location where the usability testing takes place, the duration of the testing, and how the research participants are recruited. The way that the research is conducted and the language used will effect weather children are able to refuse to participate which is an important right of all research participants. Adequate thought and preparation can ensure that research which children is conducted ethically and provides credible results.

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