

# **RESEARCH METHODS FOR CHILD COMPUTER INTERACTION – CHI 2018**

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## **APPENDIX A**

### **Research Planning Form – Pens and Stuff**

**School name and location:** Three schools and a house

**Date:** 5<sup>th</sup> Feb

**Title of activity:** Research

**Activity designed by:** Marge

**Activity carried out by:** Marge, Bart, Homer

**Age of children:** 6 to 9 ish

**Description of the activity carried out:** There will be an experiment to calculate effort, then an observation in classrooms to see happiness and then some parent work at home

**Group or individual work:** Individual

**If group, how many per group:** n/a

**Time given to the activity per group:** various – from 20 mins to an hour

**Number of children in class:** 28 in largest class, then 22, 26

**Will everyone get a go?:** yes

**Research question behind the activity:** Which is most effective? Which is most fun?

**Apparatus:** 15 tablets, some notepads, pens, writing to copy, timers

**What data will you collect?:** times, writing (counted in words), opinions, measures by parents

**Will you collect any personal or identifiable information? :** no

**Where will this data stored (and for how long?):** who knows

=====

**Comment/Reflection on what did/didn't work:**

**Any photos taken:**

## **Appendix B**

In 2001, Kori Inkpen studied children's use of drag and drop and point and click using a mouse and a standard PC. Your challenge is to revisit this idea with modern technologies and modern-day children. You may choose to study the same two interaction styles or one or more different ones.

### **Research Planning Form**

**School name and location:**

**Date:**

**Title of activity:**

**Activity designed by:**

**Activity carried out by:**

**Age of children:**

**Description of the activity carried out:**

**Group or individual work:**

**If group, how many per group:**

**Time given to the activity per group:**

**Number of children in class:**

**Will everyone get a go?:**

**Research question behind the activity:**

**Apparatus:**

**What data will you collect?:**

**Will you collect any personal or identifiable information? :**

**Where will this data stored (and for how long?):**

=====

**Comment/Reflection on what did/didn't work:**

**Any photos taken:**

## **Appendix D**

In 2010, Druin et.al looked at how children carried out searches using Google at home. Your challenge is to consider how you could study information seeking and information finding within the context of everyday lives of children in home and / or school settings. You should NOT consider setting up an experimental study nor should you engineer a study.

### **Research Planning Form**

**School name and location:**

**Date:**

**Title of activity:**

**Activity designed by:**

**Activity carried out by:**

**Age of children:**

**Description of the activity carried out:**

**Group or individual work:**

**If group, how many per group:**

**Time given to the activity per group:**

**Number of children in class:**

**Will everyone get a go?:**

**Research question behind the activity:**

**Apparatus:**

**What data will you collect?:**

**Will you collect any personal or identifiable information? :**

**Where will this data stored (and for how long?):**

=====

**Comment/Reflection on what did/didn't work:**

**Any photos taken:**

## USING THE PETT QUESTIONNAIRES

### *Introduction*

This chapter is primarily designed to provide guidance to researchers who wish to adopt the PETT questionnaire set for use in their own studies.

### *Before the Study*

The PETT questionnaire set has been created to provide the research community with a valid and reliable method for collecting prior experience data from children between the ages of 7 and 11. PETT has been tested with children of this age range however this does not mean that it cannot be used with older or younger children. If the intention of the study is to use children outside of this age range then a pilot study will be required to assess how well these children can complete the PETT and also to check if there are any language issues; this will be more relevant to younger children than older children.

The PETT has been designed to be used either as single questionnaires or as a set. In this discussion, the use of each specific questionnaire in the PETT will be discussed in the section relating to that questionnaire. By splitting PETT up it can also be used at different stages of a research study so that the length of the questionnaire does not have an effect on the children completing it. When conducting PETT as a set of surveys, it would be good practice to vary the order each questionnaire is presented - just to be sure of minimising order effects - to the children, however pretesting did not provide any evidence that varying the order had any effect on the responses received. Table 1 shows the average times taken to complete the PETT with children for children of each age between 7 and 11 years old. The standard deviation is also provided to highlight the range of times expected by each age group.

**Table 1: The average time and standard deviation for the completion of PETT by children of each age group.**

Age	Average Time (mins)	Std Dev (mins)
7	13:33	4:51
8	8:33	1:39
9	7:16	2:18
10	6:06	1:38
11	5:15	1:05

Given the lengths of times indicted here, it is recommended that the use of PETT with children of 7 years and below is as separate questionnaires, possibly interspersed throughout a study rather than administered in one single go. For children aged above 7 the questionnaire can be conducted in the way most appropriate for the research study. It is recommended that for children age 7 or below that the maximum number of children surveyed at once is four so that a researcher can be on hand to assist the children, however a smaller number would be preferable in case the need arises to read the questionnaires to children whose reading ability is not good enough to complete the PETT unaided. Four children is an appropriate group size for older

children completing PETT however there is no evidence to suggest this could not be increased for older children, particularly aged ten or eleven.

Girls have been shown to complete PETT in a quicker time than boys and therefore it is recommended that when conducting the questionnaire set with groups of children that same sex groups are chosen. Experience also shows that where possible the groups should contain children of similar ability ranges as it is more likely that these children will complete the questionnaires in similar times meaning that the quicker children do not have a long time waiting for the rest of their group to finish the questionnaire.

Where the set of questionnaires is administered in a group, the high standard deviation shown with the younger children also suggests the addition of a filler activity for children who may complete the questionnaire as there may be groups within which some children might take considerably more time. This filler activity does not have to be survey related but if possible could be used to provide further data useful to the main research study.

It may be the case that further questions specific to the research study are required to complement the questions provided in PETT. Guidance of the creation of these questions will be provided in section 10.6 following the specific guidance for the three individual questionnaires within PETT. Before conducting a survey with children it is recommended that the research team familiarises themselves with the SWC guidelines for conducting surveys with children. SWC Guidelines 1, 6, 9 and 11 the most important as these are relevant to researchers even if PETT is being used without additional questions being added.

The following sections provide guidance of how to adapt each questionnaire. There may be occasions where each question requires a small amount of editing due to the wording in the technology or task applied to it. The questionnaire set has been designed in English in the UK without the use of regional terms that may be less relevant in other places. If used in other countries it may be necessary to check the language in case any cultural differences exist that need alteration. Translating PETT into other languages needs to be carried out by the research team ensuring the language used is pretested to ensure it is appropriate for the children participating in the study.

### ***Adapting the CTUQ Questionnaire***

The CTUQ questionnaire has been designed to gather children's self-report of their prior experience with a specific piece of technology. The questionnaire has been written to enable its use with any piece of technology. If a study involves more than one piece of technology, then the CTUQ questionnaire could be adapted and administered for each piece of technology. The CTUQ can be used as a standalone questionnaire to gather knowledge of a specific piece of technology if the use of the other questionnaires within PETT are not deemed necessary. Figure 1 shows the full generic question set for the CTUQ questionnaire:

1. Do you know what a [technology] is? Yes  No

2. Do you have your own [technology]? Yes  No

3. Do you use a [technology] at home? Yes  No

4. How many days a week do you use a [technology] (circle your answer)?  
 0 days      1 or 2 days      3 or 4 days      5 or 6 days      7 days

5. How good do you think you are at using a [technology] (circle your answer)?







very good      good      okay      not very good      poor

6. Does your school have [technology] you can use in class? Yes  No

7. Do you use it with your teacher in your class? Yes  No

8. Have you ever [carried out a task] on a [technology]?  
 Yes  No

9. Can you write down [n] things that you use your [technology] for?  
 .....  
 .....  
 .....

**Figure 1: The generic CTUQ questionnaire**

**CTUQ Question 1**

1. Do you know what a [technology] is? Yes  No

**Figure .2: CTUQ question 1**

Question 1 asks the child whether they know what the technology involved in the research study is. If not then this shows the child has no experience of the technology at all.

**CTUQ Question 2**

2. Do you have your own [technology]? Yes  No

**Figure.3: CTUQ question 2**

Question 2 asks the child if they own the technology. If so then this would imply a degree of knowledge of its use over those who do not own it.

**CTUQ Question 3**

3. Do you use a [technology] at home? Yes  No

**Figure 4: CTUQ question 3**

Question 3 asks the child if they use the technology at home. This is different to the previous question as its purpose is to find out if they have access to the technology, and use it, when at home.

#### CTUQ Question 4

4. How many days a week do you use a [technology] (circle your answer)?

0 days      1 or 2 days      3 or 4 days      5 or 6 days      7 days

Figure 5: CTUQ question 4

Question 4 asks the child how often during the week they use the piece of technology in order to determine frequency of use. It may occasionally be the case that a week is not an appropriate scale to use in this question in which case the research team would need to alter the scale to reflect this. If the scale is changed it is recommended that the response options are kept to a maximum of 5 and that the question is piloted before use.

#### CTUQ Question 5

5. How good do you think you are at using a [technology] (circle your answer)?



Figure 6: CTUQ question 5

Question 5 is designed to gather the child's perception of how good they are at using the technology – this provides a confidence rating of the child in using the specified device.

#### CTUQ Question 6

6. Does your school have [technology] you can use in class?    Yes          No   

Figure 7: CTUQ question 6

Question 6 is designed to measure opportunity of use alongside question 3. Combining the results of both questions highlights how much interaction the child may have with the technology at the two locations in which they spend the majority of their time.

#### CTUQ Question 7

7. Do you use it with your teacher in your class?      Yes          No   

Figure 8: CTUQ question 7

Question 7 will provide insights into whether the child has had training using the piece of technology at school. If the device is used at school a certain level of training might well have been provided to the child to ensure all children in the class have enough knowledge to interact with it.

#### CTUQ Question 8

8. Have you ever [carried out a task] on a [technology]?

Yes          No   

Figure 9: CTUQ question 8

Question 8 is designed to provide a small amount of knowledge about the main task that the study involves. If the study does not involve a specific task then the task added into this question should be decided upon by the research team. The secondary purpose of this question is for it to be identical to CTEQ question 6 which is the task based questionnaire. This will allow a basic reliability test to be performed to measure whether the responses to these two questions are the same.

**CTUQ Question 9**

9. Can you write down [n] things that you use your [technology] for?

.....  
.....  
.....

**Figure 10: CTUQ question 9**

Question 9 provides data on a child’s knowledge of the technology and also their diversity of use when using it. It will also allow the research team to gather data on the most salient tasks carried out using the technology by the children in the study. The number of responses required can be determined by the research team however the recommended number of responses is 3 as this number has been shown to be an appropriate number for children in the specified age range.

***Adapting the CTEQ Questionnaire***

The CTEQ questionnaire has been designed to gather children’s self report of their prior experience in carrying out a specific task unrelated to the technology in which the task was performed. The questionnaire has been written to enable its use with any technology related task. If a study involves more than one task then the CTEQ questionnaire could be adapted and administered for each task. The CTEQ can be used as a standalone questionnaire to gather knowledge of a specific task if technology experience is not required. Figure 10.11 shows the full generic question set for the CTEQ questionnaire:

1. Do you know what a [task] is? Yes  No

2. Have you ever [carried out the task]? Yes  No

3. How many [times did you carry out the task] last week? (circle your answer)?  
[appropriate scale goes here]

4. How good are you at [doing the task] (circle your answer)?







very good      good      okay      not very good      poor

5. How much do you enjoy [doing the task] (circle your answer)?







a lot      a little bit      not bothered      not much      don't enjoy

6. Have you ever [carried out the task] on a [technology]? Yes  No

7. Try to name [n] other pieces of equipment you have used to [carry out the task]:

.....

.....

.....

**Figure 0.11: The generic CTEQ questionnaire**

**CTEQ Question 1**

1. Do you know what a [task] is? Yes  No

**Figure 0.12: CTEQ question 1**

Question 1 asks the child whether they know what the task involved in the research study is. If not then this shows the child has no experience carrying out the task at all.

**CTEQ Question 2**

2. Have you ever [carried out the task]? Yes  No

**Figure 0.13: CTEQ question 2**

Questions 2 asks the child if they have ever carried out the task, this can show whether they have any experience, as simply knowing about the task does not show they have ever done it.

**CTEQ Question 3**

3. How many [times did you carry out the task] last week? (circle your answer)?  
[appropriate scale goes here]

**Figure 0.14: CTEQ question 3**

Question 3 is designed to capture the frequency in which the task is performed by the child. This can be used to get a more in depth view of frequency if combined with CTUQ question 4. The creation of an appropriate scale is down to the research team. As in CTUQ, it may also occasionally be the case where the time period of last week is not appropriate for the task in question and therefore this may need to be changed. This question would then require pretesting.

**CTEQ Question 4**

4. How good are you at *[doing the task]* (circle your answer)?

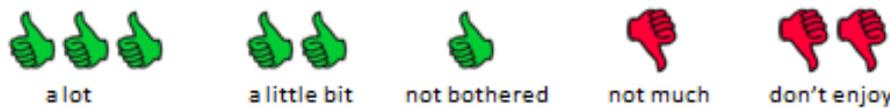


**Figure 0.15: CTEQ question 4**

Question 4 is designed to gather the child’s opinion of how good they are at carrying out the task. This data could predict the speed it takes a child to complete the task, their willingness to do the task or their ability to perform the task accurately.

**CTEQ Question 5**

5. How much do you enjoy *[doing the task]* (circle your answer)?



**Figure 0.16: CTEQ question 5**

Question 5 records how much the child enjoys carrying out the task. Enjoyment, and fun, are common measures used within CCI as they provide insights into areas such as how good a child is at performing a task, their engagement with the task, and how likely they are to explore the task and the device it is being performed on further than just completing the task.

**CTEQ Question 6**

6. Have you ever *[carried out the task]* on a *[technology]*?

Yes  No

**Figure 0.17: CTEQ question 6**

Question 6 is designed to be the reliability measure along with CTUQ question 8. The question is also designed to show experience of carrying out the task on a specific piece of technology. If the CTUQ is being used then this technology should be the same as the one chosen for this questionnaire. If not it is recommended that the technology inserted into this question is the one in which the task is most likely to be performed.

**CTEQ Question 7**

7. Try to name *[n]* other pieces of equipment you have used to *[carry out the task]*:

.....  
 .....  
 .....

**Figure 0.18: CTEQ question 7**

This question is design to capture the most frequently used devices in which the task in question is carried out. On occasions where the task is predominantly carried out on a specific device the level on non-response may be high. In a task based research study this data could be quite valuable and provides the children with the ability to enter their own response providing richer data than fixed responses.

### Adapting the CTHQ Questionnaire

The CTHQ questionnaire has been designed to gather children’s self report of their general prior experience of interacting with technology. This questionnaire is not technology or task specific and therefore requires less adaptation than the previous two questionnaires. The CTHQ can be used as a standalone questionnaire when a basic level of technology exposure is required without the need for more detailed data of a specific technology or device. Figure 10.19 shows the full generic question set for the CTHQ questionnaire:

1. Do you have a lot of electrical items at home? Yes  No

2. Do you own a lot of electrical items? Yes  No

3. Do you own a games machine (examples: X-Box, PlayStation, Nintendo DS)?  
Yes  No

4. Do you have your own mobile phone? Yes  No

5. Tick the sentence below that you feel best describes you (only choose one):

I use electrical items as often as I can

I use electrical items to make things easier to do

I use electrical items when I am bored

I do not use electrical items very often

6. Please tick which of the following items you have ever used:

[item]	<input type="checkbox"/>	[item]	<input type="checkbox"/>
[item]	<input type="checkbox"/>	[item]	<input type="checkbox"/>
[item]	<input type="checkbox"/>	[item]	<input type="checkbox"/>
[item]	<input type="checkbox"/>	[item]	<input type="checkbox"/>

7. How easy do you find it to use electrical items (circle your answer)?







very easy      easy      ok      hard      very hard

Figure 0.19: The generic CTHQ questionnaire

### CTHQ Question 1

1. Do you have a lot of electrical items at home? Yes  No

Figure 0.20: CTHQ question 1

Question 1 asks the child to provide their opinion on the amount of electrical items they have at home. This question is not about ownership it is designed to gather data on how much the child perceives technology to be a part of their home life.

### CTHQ Question 2

2. Do you own a lot of electrical items? Yes  No

Figure 0.21: CTHQ question 2

Question 2 again relates to access and opportunity of use but this time asks the child to self-report how much technology they personally own. As well as providing further information about access to technology it also provides insights into the child's everyday use of technology.

**CTHQ Question 3**

3. Do you own a games machine (examples: X-Box, PlayStation, Nintendo DS)? Yes  No

Figure 0.22: CTHQ question 3

Question 3 is designed to provide insights into the amount of technology exposure the child has had. The games console is one of the most owned technologies by children and is often used for lengthy amounts of time. Games consoles are known to provide multiple interaction techniques and are often used in conjunction with other technologies so a child owning their own games console is likely to have had more experience interacting with technologies than a child who has not. The specific games consoles provided as an example in this question should be checked and if necessary updated before use to ensure the examples offered are up-to-date.

**CTHQ Question 4**

4. Do you have your own mobile phone? Yes  No

Figure 0.23: CTHQ question 4

Question 4 has a similar purpose to question 3 in that it is designed to provide insights into general exposure to technology. The mobile phone is the most popular mobile device used by children and is used to carry out many everyday tasks. Again mobile phones can require different interaction techniques and are often used frequently for both short and extended periods of time. In the future it may be a case that another technology such as tablet computers becomes the most popular mobile devices at which time this question would need to be altered to reflect this.

**CTHQ Question 5**

5. Tick the sentence below that you feel best describes you (only choose one):

- I use electrical items as often as I can
- I use electrical items to make things easier to do
- I use electrical items when I am bored
- I do not use electrical items very often

Figure 0.24: CTHQ question 5

Question 5 is designed to gather the child's opinion as to how important technology is to them in their lives. The answer to this question may have an effect on areas such as how quickly they learn to carry out a task, their focus on carrying out the task and their enjoying in doing it.

**CTHQ Question 6**

6. Please tick which of the following items you have ever used:

- |               |                          |               |                          |
|---------------|--------------------------|---------------|--------------------------|
| <i>[item]</i> | <input type="checkbox"/> | <i>[item]</i> | <input type="checkbox"/> |
| <i>[item]</i> | <input type="checkbox"/> | <i>[item]</i> | <input type="checkbox"/> |
| <i>[item]</i> | <input type="checkbox"/> | <i>[item]</i> | <input type="checkbox"/> |
| <i>[item]</i> | <input type="checkbox"/> | <i>[item]</i> | <input type="checkbox"/> |

**Figure 0.25: CTHQ question 6**

Question 6 is designed to measure the diversity of experience the child has in interacting with different technologies within their lives. The items within this question should be populated by the research team ensuring then any items that could have an effect on the study results are included. The number of items that can be presented in this question is not limited although care should be taken not to be excessive.

### **CTHQ Question 7**

7. How easy do you find it to use electrical items (circle your answer)?



**Figure 0.26: CTHQ Question 7**

Question 7 asks the child for their opinion on how easy they find it to use electrical items. This question allows the child to show their confidence in using technology which could have an effect on their ability to perform a task, or learn how to perform it. It may also affect factors such as their willingness to participate, their concentration levels, and the level of enjoyment they report when participating in the study.

### **Adding More Questions to PETT**

At the beginning of this guide on using the PETT the need for further questions was introduced in case questions specific to the study are not currently covered. This section discusses this in more detail and provides guidance on how this should be done.

It is recommended at this point that the research team should read the entire SWC and SRT guidelines on carrying out surveys with children and creating surveys to elicit self report of technology use.

The wording of the additional questions should be similar to that used within PETT to ensure consistency across the full questionnaire. The language used should be pretested with a group of children of the relevant age to ensure they understand the wording and the constructs being asked. Teachers are also a good resource for checking the language of questions and could be used instead of, or as well as, children

Open-ended questions have been shown to increase the level of non-response recorded in questions compared to the use of closed questions therefore it is recommended that the use of open-ended questions should be kept to as minimum. If all response options are known for a particular question than using a fixed response format would be preferential. Scales should be presented using a maximum of 5 points with the VAS thumbs-up scale being validated as appropriate visual scale.

It is not recommended that too many reliability questions are added to a questionnaire to be completed by children as repeated questions have been shown to annoy children however this is the place where the addition of such question could be done. The use of negative questions covering the same constructs are also not advised but the inclusion of a single one should not cause to much anxiety to the participants.

Finally it is recommended to provide no more than 6 to 8 additional questions in order to keep the questionnaire size a small as possible so as not to overburden the participants.



## **CHECK1**

1. What are we aiming to discover?  
EXCUSE –  
HONEST –
  
2. Why (this question)?  
EXCUSE –  
HONEST –
  
3. Why are we using these research methods?  
EXCUSE –  
HONEST –
  
4. Why are we using these children  
EXCUSE –  
HONEST –

## **CHECK2**

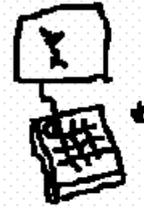
1. Why are we doing this research?
2. What do we tell (the children)?
3. Who is funding the research?
4. What do we tell (the children)?
5. What might happen in the long term?
6. What do we tell (the children)?
7. What might we publish?
8. What do we tell (the children)?

Dear Parent



PLaTUI is a set of three games that have been developed at the University of xxxxxxxx.

The designers of these games are anxious to see how easy they are for children to use and would also like to see how much fun they are. To try out the games, we are planning to bring them to the school and let your children try them out. The activity will probably take about half a day and all the children will be able to play at least one of the games.



We would like to capture some video recording and some still photos of the children playing, but we do know that this might be a problem for some children, so if you don't want your child to be recorded; do indicate.

Any recordings will be used only for the purposes of investigating the games. If you want to know more, please contact the class teacher who has seen the plans for the day and is happy that they will provide a fun and enriching experience for the children.

I agree for my child ..... to take part in the PLaTUI activity. I am / am not happy (DELETE ONE) for him to be recorded during the activity.

Signed..... Date.....

# Chapter 5 - Using Survey Methods for Research in Child Computer Interaction

## Introduction

The method of eliciting information by questioning is commonly referred to as a survey method. There are many such methods and the term survey has many meanings but for the purposes of this paper, survey methods are defined as questionnaires, rating scales and structured interviews [1]. Thus, free discussion and free form reporting is not especially considered.

Surveys are a long established instrument for data gathering and as early as the 1890's they have been reported as being used with children [2]. However, research about the efficacy of the different methods of surveying children is relatively scarce and in particular, when children are asked to contribute opinions, as is the case in self-reported research, studies that examine the validity and reliability of the children's responses are rare [3]

## Why ask Children?

In the field of Child Computer Interaction it is common to find studies that report the use of survey methods with children. In some of these studies (loosely referred to hereafter as design), children are asked to contribute ideas and suggestions for future or partially completed designs. Examples include the use of surveys to elicit detail about the mental models that children have [4], or their use to gather requirements for interfaces [5]. Often, surveys are used in research studies, where children are asked to report on their opinions of a product or supply some sort of rating [6].

There are several valid reasons for asking children for their opinions when using interactive products. One is that adults and children live in different worlds and for that reason adults may not understand what children want, "*Survey researchers are realising that information on children's opinions, attitudes and behaviour should be collected directly from the children; proxy-reporting is no longer considered good enough.*" [7]. Secondly, there is a move to include children in decisions about their own environments; this has arisen from a greater awareness that children are actors and participants rather than onlookers in society. "*In most of the western world, it is now recognised that children have a voice that should be heard and there is a new demand for research that focuses on children as actors in their own right.*" [8]. A third reason for talking to children about their interactive technologies, is that involving children in research studies of their own artefacts is fun and rewarding for researchers, developers and, more importantly, for children [9].

## What can go wrong?

Survey methods rely on the use of a question – answer process. This process can be vitally important in contributing to the success of a survey in eliciting reliable data. There are four stages in a question-answer process:

1. Understanding and interpreting the question being asked.
2. Retrieving the relevant information from memory.

3. Integrating this information into a summarised judgement.
4. Reporting this judgement by translating it to the format of the presented response scale.[10]

Researchers often discuss the importance of the question-answer process in determining the reliability of responses provided by children in surveys [3]. Factors that impact on question answering include developmental effects; language, reading age, and motor abilities, as well as temperamental effects including confidence, self-belief and desire to please.

Research into the completion of surveys has revealed four major issues that are particularly important in understanding how children respond to surveys. The first two issues are phenomena that are partly temperamental and partly cognitive in nature; these will have an impact on the design of survey studies. The second two are more to do with language and age and are rather more concerned with the detailed design of the question and answer processes.

### ***Satisficing and Optimising***

Satisficing theory identifies two processes that explain some of the differences in the reliability of responses, especially in surveys where respondents are being asked to pass attitudinal judgments [11]. For research validity, optimising is the preferred process; this occurs when a survey respondent goes thoughtfully and carefully through all four stages of the question and answer sequence. Satisficing is the opposite approach and occurs when a respondent gives more or less superficial responses that generally appear reasonable or acceptable, but without having gone through all the steps involved in the question-answer process.

The degree or level of satisficing is known to be related to the motivation of the respondent, the difficulties of the task, and the cognitive abilities of the respondent [7]. It appears obvious therefore, that if a child misunderstands a question or finds it difficult to answer then the child is susceptible to 'satisfice'.

### ***Suggestibility***

Suggestibility is particularly important with relation to survey research with children, because it "*concerns the degree to which children's encoding, storage, retrieval and reporting of events can be influenced by a range of social and psychological factors.*" [12]. In any survey, the interviewer or researcher has an effect. Even when the interviewer is trying hard not to impact on the question answer process, when the respondents are children it is sometimes impossible to not intervene. In one study it was reported "*there were many silences that needed some input if only to make the children less uncomfortable.*" [5].

Even where there is no deliberate intervention the interviewer has an effect. In one study it was shown that children are likely to give different responses depending on the status of the interviewer. This was illustrated when a research assistant pretending to be a police officer asked children questions about their experience with a babysitter. The children then assumed that the nature of the experience was bad and thus the interviews yielded inaccurate and misleading results [13]. It seems that authority figures may inevitably yield different results, as the child may want to please the person administering the survey [14].

The gender and age of the interviewer or person conducting the survey can also have an effect on the reliability or detail of responses provided by children. Borgers et al,

(2004) discuss an example stating: “There is anecdotal evidence from surveys on drugs in Germany that teenagers were far more open to elderly female interviewers and not to the young or youngish interviewers.” [3].

### Specific Question Formats

The way in which children are asked questions in surveys has an impact on the reliability of the response. Breakwell et al, (1995) report that “There is a strong acquiescence response bias in children: children tend to say ‘yes’, irrespective of the question or what they think about it.” [10]. In one study with 5-year-old children there were several inaccuracies in questions that relied on the yes/no format [14].

Free-recall questions have been shown to be useful with children, especially in spoken surveys. One study involved children who had experience of being treated in an emergency room for an injury. A few days later, children were interviewed with free recall question formats such as “Tell me what happened” and specific questions like “Where did you hurt yourself?” both being used. It was shown that as the questions became more specific i.e. “Did you hurt your knee?” the response reliability decreased [15].

One widely used question format is the use of Visual Analogue Scales (VAS). A VAS uses pictorial representations that children use to identify their feelings or opinions. This approach has been adopted as an alternative to the traditional open-ended and closed question formats although some researchers suggest that VAS can only be used with children aged around seven and over [16]. Studies in Child Computer Interaction have shown them to be useful for younger children, but have also noted that when these scales are used to elicit opinions about software or hardware products, younger children are inclined to almost always indicate the highest score on the scale [17].

Below are two examples of Visual Analogue Scales developed for children for different purposes.

Figure 1: Wong-Baker pain rating scale. [18]



Figure 2: Smileyometer scale for eliciting children’s opinions [19].



### Language Effects

Children have varying abilities in spoken and written language and this makes the design of questions for surveys problematic. Research suggests that language in surveys is especially important and that vague and ambiguous words should be avoided [7]. With visual analogue scales, or with multi-choice responses, the

response options should be completely labelled to help children to produce more reliable responses [20].

Children are known to take things literally; in one study it was noted that when a group of children were asked if they had been on a 'school field trip' they replied 'no' because they did not refer to the trip as a 'school field trip.' [21]. In a more recent study, it was noted that when children were asked how good they thought a writing activity had been, some children gave an opinion of their writing as a product, thus interpreting the question in a completely unexpected way [22].

## **Impacts on studies in CCI**

It is inevitable that these four factors will affect response quality and reliability when using surveys with children. Some of these effects will be more pronounced with younger children than with teenagers. In addition, it has been noted that in some instances, children's responses are not very stable over time so it may be that all that can be elicited from a survey is a general feel for a product or a concept with a particular group of children at a particular time [23].

In studies in Child Computer Interaction, the stability of responses and the reliability of responses are generally not critical (as could be the case where a child is being interviewed as part of a criminal investigation). Given this, there are several useful approaches that can be taken to make the surveying process valuable and satisfactory for all the parties.

### **1. Keep it short**

Whatever the children are asked to do, make it fit their time span. This will reduce the effect of satisficing by keeping their motivation high. For young children, five minutes spent in a written survey is generally long enough, more time can be given, as the children get older.

### **2. Pilot the language**

In a survey using written language, children will take short cuts if they cannot read the questions. Teachers can be useful in checking to see if the words used in the survey make sense, they may point out where words may mean something different to children. Avoid ambiguity by piloting with sample children.

### **3. Provide assistance for non / poor readers**

Even with the language checked, there will be some children who may understand the words but not the questions. Try to read out written questions if possible, doing this for all the children (as some will not admit to not understanding the questions).

### **4. Limit the writing**

Children often do not write what they want to say, as they cannot spell the words they want, cannot find the words for things they want to say, or cannot form the letters for the words that they have in mind. Children can be helped by encouraging the drawing of pictures, the use of images and by providing essential words for them to copy.

### **5. Use appropriate tools and methods**

Reduce the effects of suggestibility and satisficing by using special methods. The Fun Toolkit that is presented in the next section of this chapter provides tools to assist children in discriminating between rival products [24]. In interviews, use

visual props to help articulate ideas. If interviewing, consider taping the discussion so that the amount of ‘suggesting’ can be examined later.

#### **6. Make it fun**

Introduce glue, scissors, sticky tape or coloured pencils to make the experience fun for the children. If at all possible print questions in colour and supply thank you certificates when the children have finished participating

#### **7. Expect the unexpected**

Have a back up plan. If an entire project depends on the results of a survey with children it may well fail! Triangulate where possible by gathering self reported data, observational data and some post hoc thoughts from researchers and participants.

#### **8. Don’t take it too seriously**

One of the great pitfalls in research and development work is to read too much into data. The information gained from a single group of children in a single place is not likely to be especially generalisable. Avoid the temptation to apply statistical tests to children’s responses, rather look for trends and outliers!

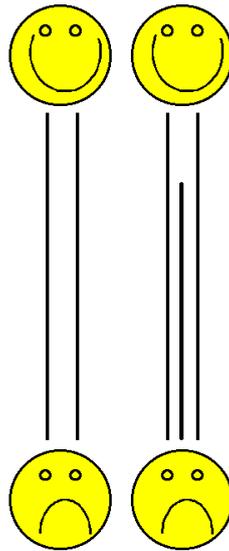
#### **9. Be nice**

As outlined earlier, interviewer effects are significant. To get the most from children, interviewers and researchers need to earn the right to talk to them. This may require several visits and may require an investment of time to learn about their culture and their concerns.

There is no doubt that designing and carrying out good surveys takes practise and patience but following these guidelines may avoid many of the common errors and minimise harmful effects.

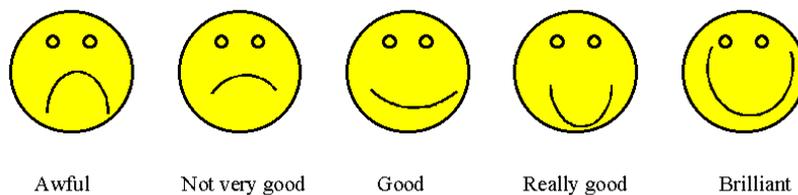
### **The Fun Toolkit**

The fun toolkit comprises a ‘Funometer’, a ‘Smileyometer’ an ‘Again – Again table’ and a ‘Fun Sorter’. In this section, the four tools are described and then some suggestions are made for how they can be used. The first tool, The Funometer, is a variation of a tool by Risdén, Hanna, & Kanerva, (1997). It has a vertical scale, designed to simulate a thermometer, in which the child draws a vertical bar representing the amount of fun. Figure 1 shows two funometers, one that is awaiting completion, and one that has been completed.



**Figure 1 The Funometer – before and after completion**

This tool requires the evaluator to measure the height of the bar that has been drawn by the child and give it a score. The second tool (the Smileyometer) is a discrete variation of the Funometer that was originally designed with the help of some children. During use, children are asked to tick one face. This is a very easy tool for the children and it includes textual information to improve the validity. The Smileyometer differs from the Funometer in that it is digital and in this instance it is common to apportion scores of 1 to 5 for the different faces; if used in this way, the evaluator needs to be aware that the scale is only a rank ordering as the difference between say 3 and 4 may not be the same as the distance between 4 and 5.



**Figure 2 The Smileyometer**

These two tools can be used in isolation; the child looks at a product or carries out a task and gives a rating using the Funometer or Smileyometer (but not both). Evidence of using these metrics has shown them to be very easy to complete but children will tend to choose the extreme faces and so the resulting data is not always especially helpful.

In many evaluation studies, the desire is to rank a series of connected or competing activities or technologies. This can help the evaluator determine which may be more appealing or which may be least fun. Repeated instances of the Funometer or the Smileyometer can be used but the Fun-Sorter, a variation on a repertory grid test (Fransella and Bannister 1977), can be useful in this context. The Fun-Sorter has one or more constructs and a divided line (or table) that has as many spaces in it as there are activities to be compared. The children either write the activities in the spaces, or for younger children, picture cards can be made and placed on the empty grid.

	Best			Worst
Worked the best	B	D	A	C
Most Fun	D	A	B	C
Easiest to do	A			

Figure 3 – A partially completed Fun-Sorter, for 4 activities and with 3 constructs

This tool has been evaluated in a number of field trials and it is encouraging to note that in general children understand the meanings of the different constructs and it has the advantage of forcing some discrimination. The fourth tool is similar and is the ‘Again –Again’ table which can also be used to compare activities / events. This table lists some activities on the left hand side, and has three columns headed Yes, Maybe, and No.

**Would you like to do it Again?**

	Yes	Maybe	No
Visit U Boat	✓		
Puppet show		✓	

Figure 4 – Part of an Again – Again table

The child ticks either yes, maybe or no for each activity, having in each case considered the question ‘Would you like to do this again?’

**Guidelines for Using the Fun Toolkit**

Research has identified some guidelines for the best use of these tools. As noted above, young children using the Funometer and the Smileyometer have been seen to often record events as ‘Brilliant’ and so for them, these tools are of limited value when used in isolation. Indeed, Smileyometers have been used before and after activities to measure expectations and it has been seen that in most cases, children almost exclusively report having got what they expected to get (Read, MacFarlane and Casey 2002)! This suggests that fun measures may almost be carried out before an event took place! It is highly possible that the child’s perception of the fun they experience is governed by their expectations; in which case, the design of an interface is of much less importance than the ‘advertising and promotion’ that precedes the child’s experience of it.

Both the Fun Sorter and the Again - Again table can help in discrimination. It has been noted that children sometimes change their responses on the Fun Sorter, especially when they are young. Anecdotal evidence suggests that this is due to them not wanting to leave one feature or one product with the worst score in everything (Read, MacFarlane and Casey 2001). This behaviour, termed 'Fair Play', has not been reported in studies not seen when using the 'Again – Again' table and so this may be a better tool.

## Summary

This chapter has provided an overview of the pitfalls and difficulties that are associated with survey methods for children. It has highlighted the impact of language on evaluation studies.

## Practical Tips

- ◆ Don't ask too much
- ◆ Check the language used
- ◆ Pilot
- ◆ Use special tools

## Exercises

1. Consider the scenario in which you have been asked to interview children about their use of Microsoft Paint to determine what are the most loved and least loved features of this application; choose a target age group and devise seven questions that you would ask them and then, if possible, try out your questions on a child
2. 'When nothing means something' In a survey study, the child may not answer, drawing on the work presented in this chapter, and reflecting on your own experience, discuss what a null answer might mean if the respondent is a) a six year old boy or b) a thirteen year old girl.

## Further Reading

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