“Help! What do I do now?”: interactive help for young children - a case study

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Abstract

An effective help system is an essential feature of any user-centric computer application. There is a wealth of knowledge and support tools available to aid in the development of help systems for adults but relatively little on the development of help for young children. The design of a help system for children – particularly pre-reading aged children is considerably different than the heavily text based systems typically used in adult applications. Researchers interested in developing design methods for help systems need feedback from case studies that have been tried and tested with children in order to assist in the development of design guidelines and methodologies. This paper considers the requirements of the child as a user needing help and proposes a help system. The system is integrated into a prototype literacy application in order to evaluate its effectiveness when used with young children. The conclusions discuss the strengths and weakness of the proposed system and consider further work needed in this area.

1 Introduction

There is wealth of design and implementation information on providing help for computer applications ranging from context sensitive help to natural language query processing (WinWriters, 2002). Help design for young children however is very sparse in comparison. Interface design for young children, of which application help is a subset, is a different challenge to that of adults. Although some of the HCI design guidelines can be applied to children’s applications, there are fundamental design differences when the children are of pre-reading age (Bermen, 1977). Text messages and instructions are typically used in adult applications to provide feedback in the form of instructional and general help – but how do we provide help for user’s that are not yet able to read?

A help system for infant or pre-reading children has to be very simple and intuitive yet remains effective. The help system proposed in this paper was evaluated by integrating it into a prototype literacy application then observing its use in the classroom by five infant children. As children are the users, they are typically used as testers (Oosterholt et-al, 1996), (Berman, 1977). The observations were video taped in order to further study the effectiveness of the interface and thus measure the validity of the proposed system.

2 The Literacy Application

An educational application was developed to act as a vehicle for testing interface design methods and a help system. The application has been developed in a modular and maintainable form for ease of modification. This modularisation easily enables new ideas or modifications to previous interface proposals to be integrated and tested using the same core application.

The application consists of three activity screens and a main menu screen as illustrated in figures 1 to 4. Only three activities were needed as these cover most of the typical interaction techniques found in children's educational applications.

Figure 1. Menu

Figure 2. Alphabet

Figure 3. Own Name

Figure 4. Colours

2.1 Menu screen

The child selects one of the three available activities illustrated in Figure 1 by clicking the appropriate control using the mouse.

2.2 Alphabet activity

In the activity illustrated in Figure 2, the child is asked to find a particular letter of the alphabet and click it using the mouse.

2.3 Own Name activity

In the activity illustrated in Figure 3 the child is asked to "write" their first and last names by clicking the appropriate letters of the alphabet displayed on the screen.

2.4 Colours activity

In the activity illustrated in Figure 4 the child is asked to select a colour from the paint box and drag the paint onto the word representing the colour of the paint.

3 Types of help

Help in a computer application is delivered in various ways including instructional, interaction feedback, analytical and critical. An application developed for a young child needs to provide this help in either a graphical or verbal form as text is unavailable to the designer. Various forms of help have been proposed and integrated into the application.

3.1 Instructions

At the start of each activity, detailed verbal instructions are given on how to carry out the required task. Detailed instructions are essential for anything other the most trivial task. However, the interface should still be intuitive regardless of the detail of the instructions. After using the application more than once, the child will become more familiar with the task so the detailed instructional help may be disabled by the teacher to avoid the child becoming impatient.

3.2 Purpose

Instructions help with the operation of the application but an explanation of the purpose should also be given on pedagogical grounds in order to help the child appreciate the reason for performing the required tasks..

3.3 User invoked help

The child may want help and will look for a help control. As text is unavailable, the icon of the help control has to be obvious and the child needs to be directed to it. The literacy application uses the picture of a dog and identifies the control during the instruction phase by generating a barking sound and moving the dog. The barking sound has an association with the dog and the movement of the dog attracts the child's attention to the control. The help control is used in this application to provide high level help; it is used to remind the child of what they were doing or offers indirect help to encourage them to think through what they should do.

3.4 Interaction

Help is available indirectly by providing feedback as to the operation or active state of a control. For example, when a child rolls the mouse cursor over a control on the menu screen, a spoken description of the purpose of that control is heard. When the mouse cursor is rolled over a letter of the alphabet, the cursor changes shape to indicate that the control is active.

3.5 Reminder

Children are often impatient or simply do not listen to instructions. They are sometimes distracted and forget what it is there were doing so a means of repeating the question or details of the task needs to be designed into the interface. In the case of the literacy application, this is provided in two parts of the help system: if the child invokes help using the help control, they are reminded of what they should be doing and if they get a question wrong, they are reminded at that point also.

3.6 Results

Results of the child's action can be considered to be part of the help system if help is given when the child's action is incorrect. For example, if the child selects the wrong letter of the alphabet, the verbal feedback will tell them which letter they selected and that it was the wrong one. It then reminds them of the name of the letter they are supposed to find. In the Own Name activity, if the child selects the correct letter but wrong case, it will tell them that the letter is correct and remind them that names are case sensitive.

3.7 Automated help

The help system can be automated. This enables the application to monitor the child's responses and provides unsolicited help if required. The level of complexity of this part of the system can range from simply detecting an error occurring more than once to making informed decisions of what help to give based on a level of artificial intelligence (Snape, 1999). The literacy application will provide detailed help if the child makes 'n' consecutive errors where 'n' is configurable by the teacher. The child is told that they are about to be helped then the application takes control of the cursor. The cursor is moved to the appropriate places and the mouse button clicked to illustrate exactly what is required. This is the lowest level of help offered by the system.

4 Evaluation

Five infant children (two girls and three boys) took part in the evaluation phase. The following is a summary of the observations:

- All of the children were able to easily navigate their way through the activities with only the help of the verbal feedback provided by active controls.
- In the colours' activity, one child continually tried to drop the coloured paint onto the paint box lid. Automated help would have shown him what to do but the system assumed that the child would drop the paint onto a word as instructed and is only triggered when the wrong word is selected.
- One boy was confused between the letters 'b' and 'd' on the alphabet activity. This was an ideal opportunity for the automated help to excel. However, he would not commit himself to one or the other for fear of choosing the wrong one. He asked me which he should choose and I told him to select either and not to worry. When he selected one (the wrong one) the help system started and he was able to continue.
- Whenever the children were unsure of what to do, they pressed the help button rather than actually trying to answer the question. As the help button is little more than a reminder of the question, it was of little help to them.

5 Conclusions

The effectiveness of the help system was observed at all levels ranging from instructions through to the automated help. The system was successful at the instructional and feedback level in that the children were able to understand what to do and easily navigated their way through the system. However, some interesting and unanticipated usability problems were observed with the main help facilities.

The automated help was not as effective as expected. The main problem was that the children were reluctant to select an object if they were not sure that is was correct and this is the trigger for the automated help. However, once the help was triggered, it was observed to be very effective. Perhaps the introduction to the application should more clearly state that if they answer a question incorrectly then they will not be penalised and help will be given. Perhaps the children would be less reluctant to choose an object if they were not being observed and the method of using direct observation to evaluate actually skewed the evaluation results.

The user invoked help was not used as anticipated. As the children were reluctant to try an answer they were unsure of, they always invoked help by clicking the help control and expected the application to show them or tell them what to do. This level of help deliberately avoids giving the child the answer in order to encourage them to think about the problem rather than simply being shown the answer. As this only offers high level help such as reminding them of the question, it was of little or no help to them when the problem was educational rather than operational. It was observed however, that the children did think about the problem before invoking help so the introduction of a timer into the help system may be of benefit; after a preset period of time has elapsed between answers, the help system could offer hints and encourage them to try what they consider to be the most likely solution. If they choose the wrong one, they could be encouraged to try again until they trigger the automated help that will show them the answer and provide an explanation.

It would be beneficial to modify the application's help system to address the observed limitations and test it with children again both observed and unobserved. The unobserved sessions could be video taped but the presence of a camera could generate the feeling of being observed. If a hidden camera is impractical, the application could be easily modified to include an interaction recorder; this would record all of the mouse movement and interaction without the child's knowledge such that it could be replayed and observed after the event.

6 References

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