

Virre - Virtual Reflecting Tool

P.J. Eronen, I.Jormanainen and M. Virnes

Department of Computer Science

University of Joensuu

P.O. Box 111

FIN-80101 Joensuu

FINLAND

{peronen, ijorma, mvirnes}@cs.joensuu.fi

Abstract

Virtual Reflecting Tool (Virre) was developed to support children's reflection process and tutors' data gathering in Kids' Club technology club. Returning back to learning process by reflecting strengthens one's self-guidance and learning. This is realized in Kids' Club and with school students by using Virre. According to Kids' Club tutors' experiences, Virre is the tool that gives motivation to children to answer to questions, which benefits children's learning and collection of research data. From research point of view Virre has made the contents of children's answers richer and their thinking processes more explicit. Virre is at the moment in the development phase and new versions with improved functionality will appear later.

1 Introduction

Virre, which stands for Virtual Reflecting Tool, is a tool to support children's learning in its reflection phase. This is achieved by allowing children to use their natural means for communication, that is oral verbalization. The idea about a virtual reflecting tool aroused when tutors and researchers participating in the Kids' Club project noticed difficulties in getting useful information from the children through web form questionnaires. Neither were Kids' Club people satisfied with the depth of the reflection process among the children in the club.

Kids' Club, where Virre was developed, is a bi-directional research laboratory where children of age 10 to 15 work in collaboration with university students and researchers, apply and create novel information and communication technologies (ICT) for learning. To children Kids' Club appears as a technology club where they can learn technology skills and work playfully and collaboratively with tasks that they are interested in (Eronen et al. (2002b), Eronen et al. (2002a)). Kids' Club can also be seen as an idea generator, which creates new research questions and solutions based on requirements found in Kids' Club.

At first, Kids' Club tutors and researchers realized data gathering about children's experiences and learning in the club activities by using the web form. The web form was introduced on spring 2002 to offer both tutors and researchers with easy access to children's answers to reflection form. It was also considered that storing the answers with help of the web form would facilitate their future use. After each Kids' Club meeting, children had about twenty minutes time to answer to the questions on the web form concerning for example what they had done and learned during the club sessions, what kind of problems they had found, how they had solved those problems and how would they like to develop their robot next. Besides data collection, the questions were meant to children for reflecting their learning aiming to increase their self-direction skills and improve their learning results.

However, children's reflection with the web form did not give expected information to researchers. Children's different skills and interest to produce text in written format could be seen in the answers and in given feedback during writing. Most of the answers were very short and the content of answers was insufficient both for research and reflecting. Therefore, the reflection process with the web form was proven to be unsuitable for the children and providing little or no information for the research use. Thus, Virre was developed for needs of

Kids' Club by Kids' Club tutors and researchers on the fall 2002. Implementation was realized by using Visual Basic for Virre application, web-camera, microphone and video program.

2 Usage of Virre

In this chapter we will describe how Virre works. There are two different kinds of users in Virre. *User* is the one, for example a pupil, who reflect his or her learning with Virre and *administrator*, who prepares question sets. The administrator can be for example a teacher or a researcher. Fig. 1 presents interaction between user, administrator and application.

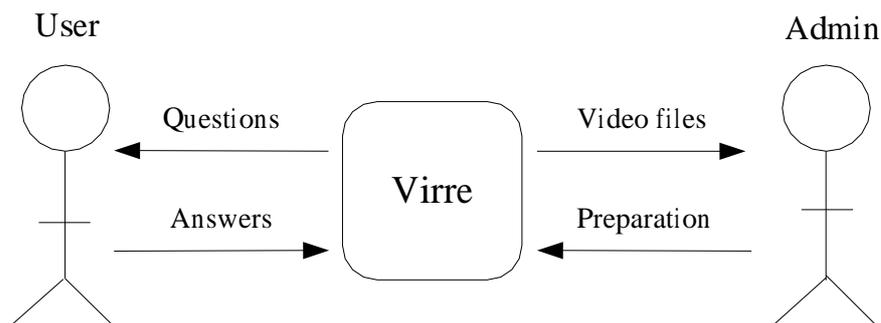


Figure 1: Interaction between user, administrator and Virre.

2.1 User

The user begins her reflecting by pressing the button in the user interface of the application. Virre plays a question and shows it at the same time as text to the user. The user answers to the question and continues to the next question by pressing the button again. User sees always his or her own picture on the display located in the center of the application. Fig. 2 presents the user interface.



Figure 2: User interface for reflecting.

2.2 Administrator

The administrator prepares the application for the use by making question sets for the users. Administrator menu can be obtained by pressing the right button of the mouse. The menu contains items for controlling the camera and preparing the question set. There are also items for setting dialog of the application. Administrator prepares a new question set by launching the dialog presented in Fig. 3. The administrator selects questions for the question set from the list, which shows all the questions available. Selecting another item from a menu above the list can change category of the questions. From this dialog it is also possible to set a description and a path where answer files will be saved.

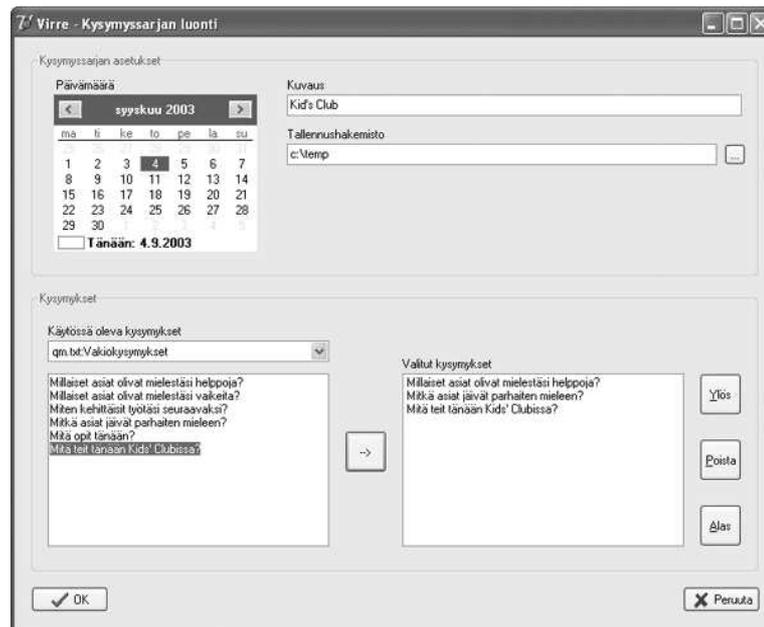


Figure 3: Dialog for creating a new question set.

3 Implementation

In this chapter we will describe technical features of Virre. The basic structure of the system will be shown. Also hardware and software needed by Virre are described.

The whole system of Virre contains four pieces. Virre application is used to control the system and it takes care of video compression. A web camera is used for video capture. A microphone is used to capture sound and it can be either an external one or built-in microphone for example when the laptop is used. The fourth piece is an external video program used for playing the captured video. Basically, any video player is suitable if it can handle Indeo 5-compressed video.

Virre uses web camera for recording the video file. At the moment, only some models of Logitech's cameras are supported. Virre uses at the moment *vportal2.dll* component which is an easy-to-use COM-object for Logitech's camera (Logitech, 2003). For future releases, there will be possibility to use basically any camera which supports Video for Windows API or DirectX (Microsoft, 2002).

4 Virre in Research and Education

Virre has two principal purposes that are a tool for research and a tool for education. In this chapter we describe usage of Virre from the research and education points of views in Kids' Club context.

4.1 Tool for Research

As a tool for research, Virre is found to be suitable especially for data gathering purposes. According to experiences in Kids' Club, data that is gathered by Virre is richer in content than data collected from web form and gives possibility to gather also non-verbal information that is user's mimics.

Current version of Virre saves each child's reflecting session to one file. From research point of view, it would be meaningful give to a researcher possibility to save an answer of each question to separate files, especially if answers are wanted to be compared to other answers. Also possibility to add comments to a record would be an useful feature. From a standpoint of data handling Virre takes more time because of the need of the transcription of answers for data analyzing purposes. However, data that is collected by Virre is richer and give contextually more information than data from the web form.

Kids' Club tutors do not need to be along in the reflecting process, which make usage of Virre flexible during Kids' Club meeting. According to children's feedback, Virre is an interesting tool increasing children's interest to use it and through this adds motivation to answer the questions. It also seems to be suitable tool for most of children despite of different verbal skills.

Children can speak to an anonymous object, which can make them feel more free to answer the question when compared to a situation where interview is done with tutor. Naturally, children are aware that their answers are recorded and can be used for research, which is important especially from the ethics point of view. The user interface of Virre was created to appear simple as possible for the users, which means that they do not need to pay attention to usage of the usage itself but only to answers to the presented questions.

Both personal reflecting and reflecting with the pair are possible by Virre, which gives to researchers possibility to observe also non-verbal interaction and roles in a group work. For instance, when a child has more active role or role of a leader in a group, the role can be seen also in reflection. In an opposite situation more passive child consents his or her pair in reflecting. In addition to verbal answer, children's reactions to questions and expressions are shown in recording. Thinking processes and reactions were difficult to observe from web forms' answers since they presented mostly final solutions. Answers recorded by Virre make child's thinking process explicit when she thinks aloud when forming an answer to the question.

4.2 Tool for Education

From the standpoint of education Virre is a tool for learning and teaching. Pedagogical standpoints of Kids' Club emphasize constructionism, problem-based learning and group processes, where self-direction and reflection are essential issues (Eronen et al., 2002b). For reaching self-directed learning children need to understand is being main part in his or her learning process. Understanding goes through observing own cognitive processes and self-assessment (Julkunen, 1998). In this reflection process Virre works as a supportive tool.

Virre makes children to think about their learning and plan their work after each Kids' Club meeting, which probably would not otherwise actively happen. This can be seen as the first step of reflecting, but children should be able to return back to their thoughts and plans and get feedback from tutors as the second step. Kids' Club tutors task is not teach, but instruct in working and help in problem situations. Tutors' instruction could be realized for instance as discussions between tutor and children or with Kids' Club group. Some tips could be added also to Virre and also availability of tutor's comments on children's reflections could be helpful in this.

The usage of Virre is not tied to time, thus children can use it independently in different phases of the working process. Virre can serve as a data-collecting tool for various purposes to administrators, that is tutors and teachers, according to recorded questions. It can be used for instance for assessment and following children's learning processes, when assessment do

not reach only the final product but whole process from several dimensions that is difficulties and group dynamics.

4.3 Creativity

One dimension of Virre is related to creativity that has been realized as unforeseen questions during reflecting session. Solution was found when Kids' Club tutors realized that children stick easily to same solution models as in their earlier projects. Tutors wanted to bring new ideas to children's working processes the way that children find ideas themselves. As an alternative method for brainstorming or discussions in a group, the brainstorming was realized in Virre by using distant thinking models (Virkkala, 1994). Tutors also wanted to disconnect children from their routines to answer to the questions and help them to detach from typical ways of thinking.

There are some questions in Virre's basic question set that are meant to shake children's thoughts and through that to find novel ideas and approaches to working processes. Question may be for example 'Are cake receipt and computer program related to each other? Give also reasons.' or 'What happens if a robot builds and programs another robot?'. One purpose of questions is to arouse interest to find for example connection between cake receipt and algorithm. In the best case, new solutions or ideas can be found from unforeseen questions and also transfer the skill to other situations, for example Kids' Club project.

5 Future Plans

The first version of Virre is a prototype with limited set of features. However, many ideas for future releases have been raised and the following features will be added:

- Any web camera could be used with Virre. With this feature Virre would be more universal and more easily adapted to any system available using different camera than Logitech's.
- Each answer could be saved to its own file. This feature is especially important for the latter use of the answers. By saving answers to separate files, it is possible to take for example any two answers for the same question by different users and compare them to each other.
- Administrator can record questions with Virre. At the moment the administrator needs to have a separate program for saving the .wav format questions. It is too complicated for non-professional user.
- Support for non-linear question sets. Here the idea is to present the idea of flowchart to question sets, which would help the administrator to create more adaptive question sets responding better to different kinds of users.
- Support for adding comments to answer files. In this feature idea is to support qualitative research work. A researcher can make her comments on user's answers and save them with the answer itself. It also helps collaboration between several researchers working on same material.
- XML-based project file. With this feature all the files, which are belonging to the same project are collected into one project file. It would include metainformation (that is for example comments) over all the files. It serves also the purpose of sharing research material among several researchers.
- No need to the external video program. This feature will be one of the first, which will be realized in future versions of Virre. In this feature the video player is an embedded

component, which will diminish the need for several different programs to be ran at the same time with Virre session.

6 Conclusions

Virre has proved to be a useful tool for research in Kids' Club environment. Changing the question set Virre can be tailored for various purposes both in research and education. During the fall 2003 Virre will be used as a reflecting and data gathering tool among school and Kids' Club children visiting our department's premises and features especially for administration use will be further developed. After development work Virre will become a helpful tool for a teacher in her work with children or a researcher gathering qualitative research material from children.

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