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THE POTENTIAL OF ONLINE INTERNET SURVEYING AND DATA COLLECTION IN TECHNICAL EDUCATION

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Abstract

The author introduces the theoretical background of online surveying, the idea of the web browser, and the steps of the technological implementation of an online survey as well as the advantages and disadvantages of the method. The essay outlines some areas where the online Internet survey method can be successfully used on the full scale of technical education. The author introduces the use of the method as part of an educational research project.

Keywords: online survey, internet, technical education, pedagogy, multimedia.

1. Introduction

In the rigid world of a traditional educational environment the teacher has a central role in transferring information. He is the exclusive source of knowledge, the central figure in the procedure of teaching and learning. He distributes knowledge and determines the level of efficiency in acquiring knowledge. The system relies far too much on his personality. In an open educational environment that is connected to a global hypermedia system, the teacher's role is completely different. He enters a special relationship with the technical infrastructure of learning, and builds up a new approach to the areas of knowledge. These changes will have a significant impact on the traditional teacher–student relationship, too. The new teaching methods will be less demanding for teachers. Administration, monitoring the advancement of individual students, and partly even assessment will be computer automated. A virtually unlimited load of digital information will be available, that can be quickly accessed and combined with the help of a standard user interface and display platform. A wealth of educational programs will help the individual progress of students. The variety of learning environments will provide everyone with the opportunity to find the learning method that best matches his cognitive style and learning preferences. The teacher's new job will have two main objectives:

1. To develop the learning environment and organize the learning procedure
   It is very demanding to develop and transform the learning environment, especially in the first phase of the transition. First of all there will be a need to provide and organize content. The new technological and content solutions will have to be incorporated into the existing learning environment first. This includes understanding, evaluating, choosing or perhaps even creating multimedia programs, getting to know Internet databases, creating resource centers, catalogues, web pages, downloading and refreshing data, learning or creating teaching and evaluation software. It will be a major task and might take a lot of work to plan the resource-sharing system of the school, the access rights, and the system to monitor the learning procedure.
2. To provide students with the necessary help, motivation and support.
   The teacher must prepare students to be able to learn on their own. They have to understand their own responsibility for the success of their education. The teacher will help students to determine their own knowledge level, motivate and support them, give advice to those, who need it, and let students know what they are required to learn and how and where they can find the information and knowledge necessary for their progress.

In this new system the teacher himself will have to keep learning as well, which makes him rather a learning partner, and his experience will make him an expert and advisor. The nature of the new technologies allows that some students learn or discover something before their teacher does. They both will have to learn how to handle this situation. We must accept and understand the fact that we are acting in an open, transforming and growing information environment [3].

The outlines of a new approach to teaching and the organization of learning are appearing in the Hungarian institutions of technical education that relies heavily on the computerized environment, that was often referred to as Information Technology, and the subjects teaching computer skills were often given the same name. Today this is changing as well, since now it is about more than just computers. The term New Information and Communication Technology (NICT) refers to all the tools and methods that help to acquire, store, use or transfer information, or to communicate [1].

The Internet is one of the fundamental tools of the NICT that makes it possible to carry out online polls or researches. In this thesis we would like to cover the potentials of using online surveys and data collection on various levels of technical education.

Another goal of this report is to discuss the circumstances and results of an online survey, carried out as part of a PhD research in 1999–2000.

2. Theoretical Background

Before discussing the actual observations, let us introduce the basic terminology of the subject matter.

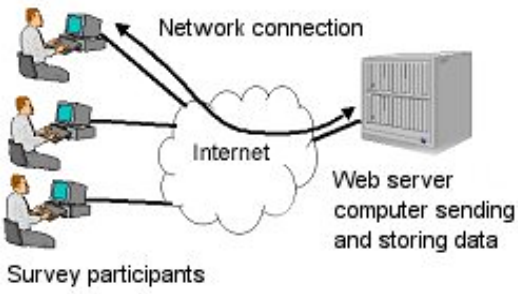

Fig. 1.

The online survey is a questionnaire or a form that is accessible with an Internet browser 24 hours a day, and after filling out the form and submitting, the data will automatically and immediately get stored on a remote computer. The theoretical operation of an online questionnaire is shown in *Fig.1*.

The web browser or Internet browser is a software that can access the web pages that are on the Internet by specifying the Internet address of the page. These *Internet addresses* (also known as URLs) begin with an http :// prefix that is not necessary to enter, as the browser will automatically add it to the specified address (e.g. `http://www.whatever.com`, that is, of course, a non-existing web address, only to illustrate the format).

3. The Method

The first step in the technical implementation of the online survey method is to create an interactive web page containing the survey form. This can be done using HTML[1], or a similar language. There are a number of shareware or freeware software programs that make it easier to create an HTML page. These are commonly called WYSIWYG[2], which refers to the practice of creating webpages by piecing together visual elements of the page rather than typing code manually. To use these editor programs one does not have to know HTML programming, all you have to do is enter (or copy) the text to a white page, and add the necessary tables and images.

Step two: place the created web page on a computer that is connected to the Internet and will be able to serve our page to anyone interested. This can be any computer equipped with a web server application. The Internet address of this computer has to be advertised to the target group in step three (e.g. www.whatever.com).

Step three: informing the target group about the survey. This can be done in regular mail, or electronic (e-mail) format, or by placing advertising images on

[1]Hyper Text Markup Language, a computer programming language

[2]Some 'WYSIWYG' web page editor programs are: Macromedia Dreamweaver, Microsoft Front Page, Anet AllWrite. Additional programs can be found at:`http://tucows.euroweb.hu`

popular web pages, or during a visit in online chat rooms we can ask the participants of the chat to fill out our survey form.

It is important to note here that the rules of netiquette must always be followed when advertising on the Internet.

Step four: analyzing the data that was gathered in a file on the web server computer (e.g. www.whatever.com). The data analysis does not necessarily have to be done on the server machine itself as the data files can be simply copied to a floppy disk and transferred to another computer.

In our actual survey the following steps were carried out:

- The answers were collected in an answer.txt file, and in an answer.htm file that served for data control.
- At the end of the survey the data in the answer.txt file was read using Microsoft Excel 97.
- The calculation of the columns and the data analysis was done using the Excel software.

Next we will discuss the main phases of filling out an online survey:

1. The person who wants to fill out the survey form (client) enters the Internet address of the web page that contains the form in his web browser (e.g. www.whatever.com)
2. When the survey is downloaded to the client's machine, he can start filling it out (see *Fig. 2*).
3. By clicking the Submit button on the survey form, the client immediately sends the form data to the web server computer that stores and serves the web page, which collects all answers in digital format at a central location.

Using this survey technique has several advantages but also disadvantages to traditional paper based solutions.

Advantages:

- As data is already stored in digital format, it can be processed quickly.
- Using certain types of questions, data can be checked before sending, therefore the number of incomplete or false forms can be reduced.
- Continuous 24-hour service and opportunity to complete the survey (the client can come whenever he has time and chance).
- Simple and cost-free use of snowball effect in research (whoever learns about the survey can simply forward this information to his friends by email).
- With data checking both open and closed end questions can be used.
- The computerized data entry eliminates a regular problem with paper-based surveys that answers are difficult to read.

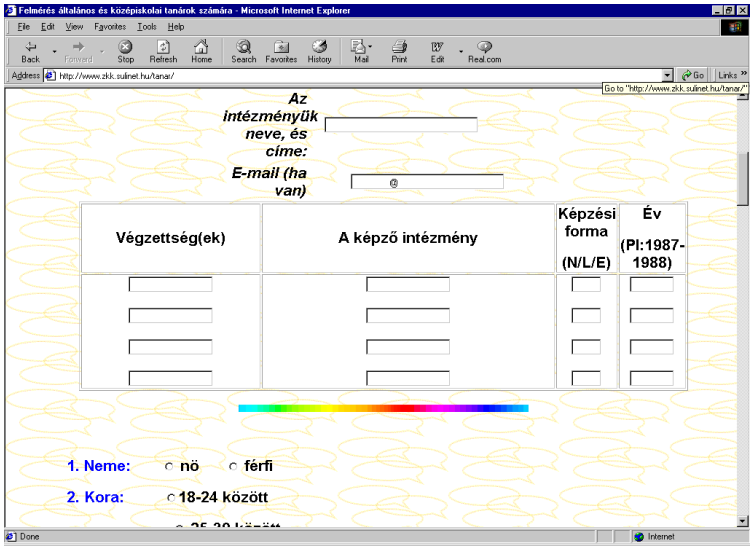

Fig. 2. An Online survey in the browser window

Disadvantages:

- Users who do not have an email address, and were not contacted in traditional ways about the survey, or who do not have any computer skills or Internet access will not be able to participate in the research.
- It is difficult to make sure that one person completes only one survey form. Using a system with adequate speed digital signatures can provide a solution for this problem.
- Difficult to rule out the use of illegal aids or consultations, if using it for testing purposes.
- Requires various resources (web server computer, online computers and maintenance personnel).
- As in most cases there is nobody to help with completing the form, ambiguous questions cannot be clarified, which might lead to unclear answers.

Due to these disadvantages, this online technique can only be used complementarily, as an extension of the traditional, paper-based method, in order to achieve the desired goal.

It is important to note that during our earlier researches we found that the lack of some proper *motivation* might result in a low number of participants in the survey. So there must be some appropriate motivation that encourages participants to complete the form in an objective way. In the case of our survey the top ten institutions that returned the most answers were awarded with a CD-Rom containing educational software.

Another experience of our research was that due to novelty, our first Internet survey was much more successful than subsequent attempts. Based on the feedback we received the reason for this might be that after completing several forms the participants grew resistant to the surveys of the same source. However, this can be an area of some interesting additional research.

4. Potential Usability

It is time to make an overview of the areas where the above online survey method can be used successfully in the field of technical education.

These areas are:

- processing data gathered from the survey
- carrying out surveys using questionnaires, data research
- testing knowledge of technical or general subjects using the internet
- online public opinion polls
- voting
- creating virtual bulletin board to share information on curricular and extracurricular technical subjects
- organizing and holding online technical competitions locally or between several schools
- interactive communication with the authorities having organizational duties.

Of course there can be many more ways to utilize the Internet, this is only a short list to raise the awareness of teachers, who will be able to creatively expand the variety of tools they use at teaching.

After this overview let's discuss the second phase of a bigger scale research project[3] (VIGH, 2000) where we made use of the online data collection methods outlined above.

This research aimed to reach the following goals:

- identify and group the dominant aspects teachers consider when choosing a development environment to create multimedia educational software, thereby helping teachers and school system administrators in making the right development environment choice.
- mapping the characteristics of the educator who wants to develop or has developed an educational software.

The practical results of the research are discussed in another article.

The research was coordinated from the Faculty of Technical Education of the Budapest University of Technology and Economics.

[3]The research was hosted by the BUTE Technical Educational PhD project.

In reaching our target group and sending out our survey we were aided by the Organization of Teachers of Information Technology and Computer Science (ISZE).

Our interactive survey was created using Frontpage 98 HTML editor. The survey was available online on the Internet 24 hours-a-day during the research period.

In our research the top ten schools that returned the most questionnaires were sent a CD-Rom containing educational software and development environments.

In the research carried out in March, 2000 the *answers of 321 participants* could be used. The research was done on a national scale. The base group consisted of all elementary and secondary school teachers. In this case the questionnaire was sent to 561 schools, out of which 353 has the word 'primary' in their name, 118 has 'grammar school' (gimnázium), 21 has both, 144 has 'technical school'. 245 answers were received in traditional paper form, and an additional 76 answers came via the Internet. The group under analysis was the educators in primary and secondary education, and since according to the 1999 statistical data there are 115146 members of this group, the sample ratio was 0.27%.

As the paper-based questionnaire was downloadable from the web page, it cannot be accurately determined what percentage of the returned paper forms were printed from the Internet, and what was received from ISZE.

The target group of educators were also contacted by email (744 emails were sent), the text of this email can be found in the Appendix. The web addresses of the schools as well as the email addresses we used to contact the teachers were acquired using the KFKI web page[4].

The gathered data were processed in Microsoft Excel 97, and this was used to create diagrams as well. Both descriptive statistical (mean, variation) and mathematical statistical tools were used for data analysis, the calculations were done using the SPSS 7.5 for Windows software.

The above example was aimed to illustrate the potentials of using computers in technical schools, or generally in various fields of education to make a list of educational and teaching tasks easier, and to support the work of the educators of today and tomorrow.

It seems that everywhere in the world only relatively few teachers can be expected to use the new tools of computer aided education. A 1998 research shows [5]that in almost half of all schools less than 20% of the teachers have some basic computer knowledge, in a quarter of them this number is between 20% and 40%, and there are only a couple of schools where more than half of the teachers can use the tools of information technology.

If the use of computer tools is made a compulsory part of teacher training (including the understanding of the methodology of digital education), we can hope that the culture of computer aided education will find its way into Hungary. Postgraduate education is important as well, but the young teachers starting their career must be prepared to use the new educational methods of this culture.

[4] http://www.kfki.hu/education/

References

[1] KÁRPÁTI, A., A számítógéppel segített tanítás módszerei, *Új Pedagógiai Szemle*, **49** (4), (1999) pp. 76–90, (Methods of computer aided teaching, New Educational Review).
[2] KÁRPÁTI, A. – VARGA, K., Digitális taneszközök az iskolában - az első országos online felmérés eredményei, *Networkshop 99 Konferencia* CD (Digital educational tools in the school – the results of the first national online survey).
[3] KOMENCZI, B., On-line – Az információs társadalom és az oktatás, *Új Pedagógiai Szemle*, **47** No. 7. (1997), (Online – information society and teaching).
[4] KSH (1999): *Időszaki tájékoztató: Társadalomstatisztika*, KSH, Budapest.
[5] KÁRPÁTI, A., Oktatási szoftverek minőségének vizsgálata, *Új Pedagógiai Szemle*, **50** No. 3 (2000), (Analyzing the quality of educational software).
[6] VIGH, D., Szakközépiskolai oktatók a multimédiás tananyagokról, *Magyar Pedagógia*, Bupapest, **100** 2 (2000) (Teachers of Technical High Schools on Multimedia educational materials).

Appendix

The text of the email inviting to participate in the research:

Dear Colleague,

As a PhD student of the Budapest University of Technology, Faculty of Technical Education, I am researching the possibilities of creating a multimedia educational software.

It would considerably help this research if you and some of your colleagues could complete a questionnaire available 24 hours on the Internet, by April 3^{d}, 2000.

The web address of the questionnaire is: `http://www.zkk.sulinet.hu/tanar`

Please forward this email to other teachers who have email address.

The top ten schools that return the most questionnaires will be given a CD-Rom containing valuable multimedia development environment, that can be used to create multimedia educational software.

The qualifying schools will be contacted by postal mail, and the CD-Rom will be sent to them.

Looking forward to receive your answers!

With thanks:

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