

Localizing and Experiencing Electronic Questionnaires in an Educational Web Site

Theodore H. Kaskalis

Abstract—One of the main research methods in humanistic studies is the collection and process of data through questionnaires. This paper reports our experiences of localizing and adapting the phpESP package of electronic surveys, which led to a friendly on-line questionnaire environment offered through our department web site. After presenting the characteristics of this environment, we identify the expected benefits and present a questionnaire carried out through both the traditional and electronic way. We present the respondents' feedback and then we report the researchers' opinions. Finally, we propose ideas we intend to implement in order to further assist and enhance the research based on this web accessed, electronic questionnaire environment.

Keywords—Electronic questionnaires, Computer assisted web interviewing, Survey data collection, Survey data visualization.

I. INTRODUCTION

QUESTIONNAIRES and surveys constitute one of the fundamental methods of research, especially in the area of education, where the human factor holds the center role. Researchers collect data applicable to their object of interest and try to process, interpret and extract useful results. However, carrying out a survey is a complex, costly and time-consuming process.

The researcher starts designing a questionnaire bearing in mind that the interest and cooperation of the respondents should be stimulated [4]. All the needed information should be present in forms that would not pose problems during the phases of analyzing the interpreting the results [1]. Moreover, the collected data will undergo a computer-based manipulation and processing, therefore the coding of questions should simplify this task [5]. These three demands often pose contradictory design decisions, which make the work of the researcher even more difficult.

The evolution of information and communication technologies paved the way towards computer-assisted interviewing (CAI), which helps the process of conducting a survey in both face-to-face (laptop) and telephone-based (desktop) interviews [3]. Furthermore, the growing rate of household Internet access allowed the appearance of the computer-assisted web interviewing (CAWI). In its simplest form, we often come across web pages with polling questions.

In a more complex form, the idea of a comprehensive, powerful and flexible electronic questionnaire environment, accessed through a simple web browser, becomes interesting and appealing. Researchers should be provided with a user-friendly but powerful tool, with which they could simultaneously perform diverse tasks such as:

- Construct a well-designed survey without worrying about practical issues, such as check boxes, rating questions or open answer containers, which often pose significant difficulties in a questionnaire design [6].

- Surpass the need for post-survey data entering, which apart from being time consuming, it is also error prone. Moreover, the automatic construction of a database, containing the answers, eliminates problems of data loss; especially in extensive open answers needed to be accessed sometime in the future [7].

- Easily visualize the questionnaire results or export the data in order to be utilized in other software programs.

- Keep a record of their surveys and have the ability to copy past surveys, in order to construct similar but not identical new ones.

- Have a means of a restriction mechanism, as regards the targeted audience that will constitute their respondents.

All the above should be offered preferably under no cost, through a recognized web server. The latter demand deals with the fact that respondents will feel more comfortable knowing that their answers are directed towards a research or scientific organization.

Bearing these in mind, we employed and offer a friendly on-line questionnaire environment through our department web site (<http://www.nured-fl.auth.gr>). Our target group consists of all Greek humanistic studies researchers willing to conduct surveys in a friendly yet powerful way. Through this paper we wish to make our effort publicly known and share our experiences in localizing, adapting and utilizing such an environment.

In the following sections, we present the characteristics of this environment and identify the expected benefits for our colleagues. Moreover, we present a questionnaire carried out through the traditional printed way and its electronic counterpart along with the first feedback we received from our respondents. This feedback includes the remarks made from survey designers, who utilized the respective environment. We conclude with some summarizing remarks and list our future ideas that could further assist and enhance the research based on this web accessed, electronic questionnaire

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T. H. Kaskalis is with the Nursery Department, Pedagogic School, University of Western Macedonia, 3rd km Florina-Niki, 53100 Florina, GREECE (phone: 30-231099118; e-mail: kaskalis@nured-fl.auth.gr).

environment.

II. PRESENTATION OF THE ENVIRONMENT

At the recently redesigned web site of our Department (Nursery Education, University of Western Macedonia, Greece) everyone can apply for an account in order to gain access to our electronic questionnaire environment. Through a login-password procedure the users enter the system and are faced with a menu of choices, supported by help files.

The offered environment is based on a localized and adapted version of the phpESP package, an open-source php-mysql software bundle (<http://phpesp.sourceforge.net>). We modified all the appropriate text files, source code and images, in order to fully translate the environment for the Greek language and did several enhancements, as regards the help files. Moreover, we improved the export functions, in order to maximize compatibility with popular spreadsheet and statistical packages (MS Excel, Openoffice Calc, Gnumeric, SPSS). We simplified several respondent restriction tasks, because our target audience is not supposed to have a strong background in computer science issues. Finally, we altered some representation aspects and debugged some minor flaws.

When users log in, they are presented with the menu appearing in Fig. 1. This simple menu directs them to the various options offered which are grouped in 5 general categories, separated by empty lines.

The first group deals with the editing of questionnaires. It includes three choices that allow the creation of a new survey, the editing of existing surveys that have not yet been published and the testing of a survey. The second group contains one choice and permits the copying of old surveys, in order to produce new ones, which can be further edited.

The third group comprises of the following two links: one that allows the change of the state of a survey and one that controls the access to an active survey. A survey can pass from the design state to an active state, so that respondents can actually access it. It can subsequently stop being active and assume an archived state, so that no more responses can be added to the collected data. On the other hand, the access to a questionnaire can be controlled through various methods: unlimited free access, numbered free access (e.g. 100 answers allowed) or numbered account access (e.g. 1 or more times for respondents who enter through a login-password procedure).

It is worth mentioning that full respondents' anonymity is preserved at all stages. Apart from their answers, no other information, that could reveal their identity, is logged (e.g. computer characteristics, browser type, access method etc). Even if the researcher decides to create specific user accounts for respondents, these accounts are not connected with the respective answers in any way. They just provide assurance for a proper user access.

The fourth group offers the visualization of the collected data, a report about access statistics to the questionnaire and an export mechanism, mentioned earlier. The respective functions are implemented through the three choices

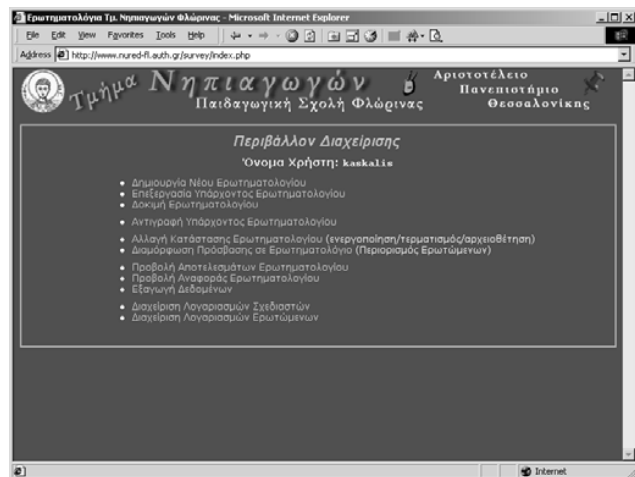


Figure 1: Main Menu Screenshot

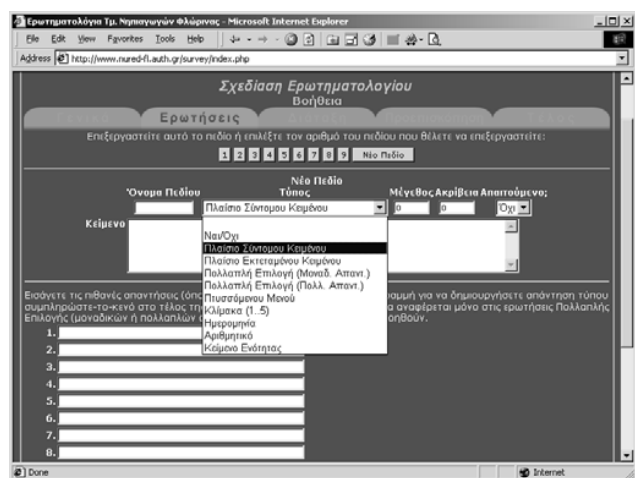


Figure 2: Survey Design

belonging in this group. Finally, the fifth group deals with the creation of two types of accounts (logins and passwords): One that refers to respondents and is closely related to the third group and one that permits the sharing of the design of a survey with other colleagues.

The creation phase of a questionnaire is an easy, guided procedure, which provides user help at all stages. As appearing in Fig. 2, the designer is offered with a large set of question types, which are selected through a drop-down box. This set of question types is quite complete, offering yes/no choices, short or long answer boxes, multiple choices with single or multiple selections, drop-down menus, rating questions, dates and numbers. Multiple choices can be accompanied with an "Other" answer box and the range of rating questions can be user defined. All designed questions can be rearranged and grouped into multiple web pages. The visualization of the collected data is automatically generated and statistical data are presented through horizontal bars (Fig. 3).

III. IMPLEMENTING AN EXISTING QUESTIONNAIRE

One of our colleagues recently carried out a research

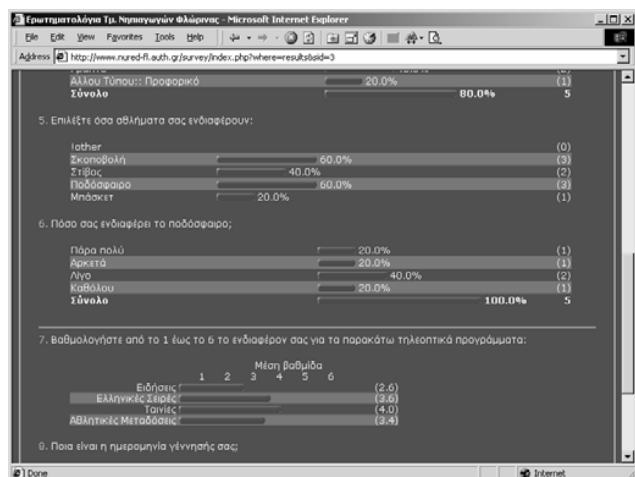


Figure 3: Collected Data Visualization

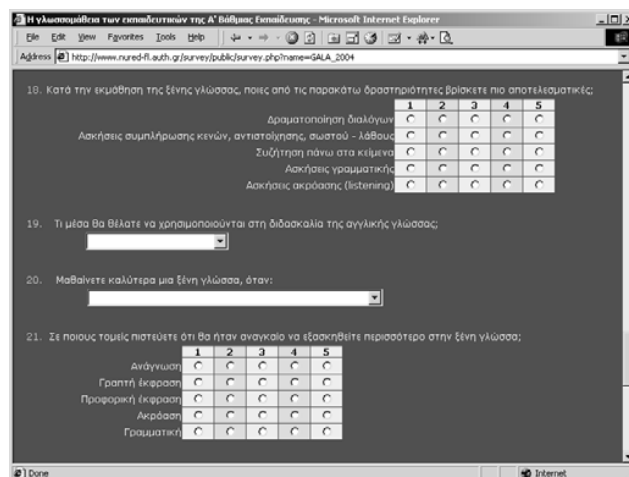


Figure 4: A Typical Questionnaire

questionnaire concerning foreign language knowledge among teachers of primary education in the wider area of Western Greece. She followed the traditional paper type of survey and posted the respective questionnaires through mail. We asked her to repeat the same task, using the offered electronic counterpart and share her experiences with us.

Being an average computer user, took her an overhead of two days to feel comfortable with the environment. Of course this overhead is only paid once. Then on, she managed to design the questionnaire in a matter of few hours, consuming significantly less time compared to the original design, using a typical word processor. Some of her complaints, concerning the environment, had to do with the simplification of some terms. Some more "live" examples should exist and several predefined choices should be offered (e.g. initial or final messages). Finally, a complete, live questionnaire example should be present and accessible at all times, in order for the designer to have an idea of all features. Fig. 4 presents a part of the electronic questionnaire under discussion.

On the other hand, the time and money savings were greatly appreciated. An average of 3 euros for every questionnaire, posted through traditional mail, was saved. Moreover, the process of obtaining postal addresses and the preparation of the envelopes were no more needed. At the same time, the electronically collected data were already present in the database, before the respective collected data from the paper survey had finished being entered.

IV. RESPONDENTS' OPINIONS

We then contacted the respondents in order to record their opinions about answering an electronic questionnaire. They generally found the environment friendly and intuitive. The overall process took them less time to complete and they persuaded more of their colleagues to take part in the survey. Trouble was with older teachers feeling uncomfortable with basic computer usage, while the overall participation superseded the paper-based one. The received feedback, as it comes from categorizing their answers and performing subsequent content analysis, was as follows:

--All respondents gladly answered the questionnaire, because they enjoyed the new and game-like character of this effort. Moreover, they felt quite bothered from the amount of printed questionnaires that are asked to answer, in various researches carried out by our colleagues.

--They consumed significantly less time to answer all the questions, as opposed to the printed counterpart.

--Almost all of them asked for instructions before starting to answer the questions, as they felt that they might *break* something, or that they could not go back and correct possible mistakes.

--There was some trouble with types of questions that raised ambiguities, regarding the way that they should be filled-in.

--They preferred answering the questionnaire in a relaxing hour from their homes. They complained about the trouble they often get into, when they have to mail printed surveys back to researchers. In fact, they stated that they have answered questionnaires at their homes that forgot to mail and no one has bothered them ever since.

--They particularly liked the fact that they were giving their opinions and points of view to a respected institution, since they felt secure when contacting a university web site.

--Finally, they asked for further on-line help and simplification, since they felt unsure about certain terms.

V. RESEARCHERS' OPINIONS

We reviewed eight researchers that conducted several surveys in an educational context. Their problems during their traditional research efforts were mainly the following:

--The lack of funds poses great difficulties in conducting large scale surveys. Researchers often have to cover the printing and mailing expenses on their own, not to mention the man-hours spent on contacting respondents.

--They usually have problems in persuading people to participate in a survey, reporting an answering percentage of only 40%.

--The whole process is frustratingly time consuming. Apart from contacting respondents, they often come across

post-office delays, holidays, strikes or periods with high posting traffic. Using a deadline date, does not compensate the problem, since respondents postpone their answers until deadline comes and often forget to answer or think that it is too late for posting back a filled-in survey.

--Finally, researchers often seek help when they move on to post-survey data entering and they usually feel unhappy with the processing and visualization of their results. Moreover, they tend to feel uncertain with the accuracy of their data.

After using our web based survey environment, researchers stated that many of the above mentioned problems were actually surpassed. More specifically:

--They found this electronic counterpart a fast and useful tool that saved them time and money.

--Although being average computer users, they felt comfortable with the environment and quickly managed to set up their surveys.

--They particularly appreciated the coverage of all possible question types and stated that, when they design a traditional questionnaire, they tend to forget certain question types that appear more appropriate to certain points.

--Finally, they achieved higher responding percentages and received compliments for their *new way* of surveying.

On the other hand, they proposed several ideas and pointed out various problems. Specifically:

--They asked for a full-scale example, containing all types of questions, to be present at all times.

--They prefer default values to populate text boxes, where survey specific data have to be entered (title, subtitle, closing remarks).

--Help should be enhanced with more examples from various research fields and technological terms should be further simplified.

--Finally, they asked for more data visualization types and proposed *printer-friendly* pages, so that they can directly incorporate results into final reports.

their personal opinions. The time and money savings prove very valuable in the whole process, while the offered survey reusability can encourage extensive research.

Our future plans include the simplification and intuitiveness of the environment, according to the feedback we receive from researchers and respondents. We intend to extend the question types, in order to include new media in the questions (photos, video and sound). Our final goal is to attract both the members of our department, carrying out their research, and other interested parties, including teachers and independent researchers, to create and employ electronic questionnaires in a fast and easy way.

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VI. CONCLUDING REMARKS AND FUTURE WORK

We cannot claim that conducting electronic surveys is a process without disadvantages, the most noteworthy of which is the coverage error. A research that includes population unable to access a computer or the Internet can be easily characterized as unreliable. This also holds even if the researcher applies methods such as weighting or the form-resistant correlation hypothesis to neutralize the effects of the coverage error [2]. In such cases a hybrid electronic-traditional method should better be considered. On the other hand, if the researcher fears cases of fraud (one user impersonating multiple respondents), the restriction mechanisms should be utilized.

As regards the educational society, though, we can accept that more and more of our colleagues become acquainted with new technologies. Moreover, web access provides almost total anonymity, making respondents feel comfortable when giving