Web Based R&D Collaboration

JELENA JOVANOVIC, VIOLETA TOMASEVIC, JOVAN DUDUKOVIC
The "Mihailo Pupin" Institute
Volgina 15, Belgrade
SERBIA

http://www.institutepupin.com

Abstract: - Modern communications, especially the Internet, can provide more efficient work in many scientific areas. This paper describes an application of Web technologies for creating data platform aimed at storing specific qualitative data related to gender issues in engineering and technology research settings. These data are collected by interviewing women/men research engineers from industrial, academic and governmental organizations in different countries. The interviews are carried out in accordance with particularly design questionnaires. Two basic functions are supported by the data platform. The first one enables on-line entry of data collected, while the second function provides presentation of all available data and their cross-comparison, if necessary. The data integrity is ensured by pre-defined user's rights. During the data entry process, each user can enter or revise the interview results for her/his organization only. Retrieval and cross-comparison of data are allowed to all users. By selecting relevant criteria such as country, nationality, research sector, category, etc. the users can obtain different sets of output data in accordance with their needs. The advantages of the use of computer and Web technologies in this application field are the following: accuracy and reliability of data, speed, simple data access, user-friendly environment, distributed work, better collaboration, extend ability, etc. For all of these reasons, the data platform provides a good foundation for many more or less complex gender analyses.

Key-Words: - internet, collaboration, gender, interviews, interviewee, questions.

1   Introduction

In recent two decades, the Internet and especially the World Wide Web application have initiated a significant transformation in the storage, distribution, and utilization of knowledge content. They have become the dominant mass media for saving a huge amount of information and efficient communication channels for millions of people all over the world. These technologies have a large influence not only on technical and natural sciences but also on social sciences. The improvements they provide can ensure shorter research cycles in social sciences and more efficient fieldwork. As an illustration of it, an application of Web technologies in sociological science is presented in this paper. Within the PROMETEA project funded by the EC FP6, a Web-based data platform has been developed. The platform provides solid data support for different kinds of sociological analyses.

The rest of the paper is organized in the following way. Section 2 specifies the domain of interest. Web-based application aimed at storing and presenting the relevant data is described in Section 3. It includes short description of technologies that are used, in realization of this application, data entry mechanisms and data retrieval possibilities. Conclusions are given in Section 4.

2   Background

Within the PROMETEA project, the domain of interest is gender issues related to engineering and technology research settings. The main goals of the project are to get to see current situation regarding women engineers' careers in research in Europe, and to propose effective measures and recommendations to empower these careers.

Research is based on specific qualitative data obtained using the PROMETEA-designed questionnaires, related to gender issues in engineering and technology research settings. These data have been collected through the interviews conducted in selected companies for industrial, academic and governmental research in different countries. The institutions are classified in two categories, depending on whether they deal with the traditional or sustainable (emerging) (non-traditional) engineering / research disciplines. There are several kinds of interviews: with women engineers in research, with focus groups of women,

with focus groups of men, with top women and the case studies of good practice, [1].

Research includes the experience of both women and men working in research. The project results should bring new perspectives on engineering and technology research, which will be key issues in both European and national research policies. Also, they should increase awareness and fairness in recognizing scientific excellence in this field.

3 Collaborative Application

Web based application called PROMETEA Database should be able to satisfy different user needs, to connect users from different countries, to facilitate their communication and to help them to analyze results. Users use different platforms and browsers.

Since Java technology is platform independent, for developing this application, we used Java Servlet for presentation logic, TOMCAT as web server solution and MySQL as a database. Tomcat implements a run-time environment, called a container, in which Java Servlets can execute and interact with the browser via HTTP [2], [3]. A servlet is loaded by the servlet container the first time the servlet is requested. The servlet receives the forwarded user request, processes it, and returns the response to the servlet container, which in turn sends the response back to the user. Afterward, the servlet stays in memory waiting for other requests. On this way the respond time is shorter, and the user get faster answer

To make a field work more efficient and to accelerate analyses of results, PROMETEA Database provides online entry of data collected by the PROMETEA specific polling instruments, like interview and focus groups and an overview of all available results of interviews stored into the database, as well as their cross-comparison.

3.1 Data storage, Data entry

The database access is possible only according to pre-defined user's rights. During the data entry process, each user can enter or revise the results for her/his country only. This way, the data integrity is ensured because the information cannot be altered by unauthorized user.

Data entering consists of two main parts. First part is defining all interviewees which took part in one interview and second part is choosing the Results Entry Form for entering the interviewees' answers. Forms for defining an interviewee and Results Entry Forms are actually represent web-based forms of the

pre-designed questionnaires. Questionnaire for defining an interviewee is called a Data sheet and it consists of main information like: nationality, gender, age range, degree level, family status and number of children and sector and category of research, Fig. 1. These characteristics help to analyze interviewees and facilitate comparison of their answers on interview questions. Also, it is possible to change entered information, or to delete them.

Fig. 1 Main information about interviewee

Before entering answers on interview questions it is necessary to connect interviewees with the questionnaires in which they took part. Since, there are two types of questionnaires, interviews and focus groups, two different ways to connect interviewees with questionnaires were developed. If only one interviewee took part in the interview the user selects the interviewee from the list of all available interviewees, Fig. 2, while in the case when more than one interviewee have participated in the focus group user selects a group of interviewees, Fig. 3.
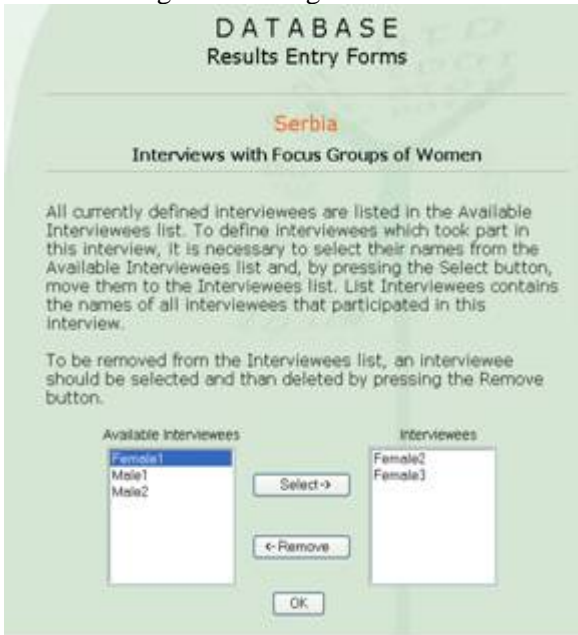
Fig. 2 Choosing an interviewee

Fig. 3 Choosing a group of interviewees

After all interviewees were associated to the corresponding interview result, the data entry can take place. All web forms for entering data are adjusted to the questionnaires that our users have already defined, hence the interface is user friendly, easy to use and logically connected. The work is much faster, since user can type directly in these forms and the data are ready for comparison.

3.2 Analysis and Retrieval tool

After all information is entered the data are ready for comparison. Comparison is one of the most important options of this application. Since all users are in different countries, they need to exchange interview answers and to compare them so they could bring out the conclusion of the research. Instead of exchanging e-mails and printing these interviews, with this system users get all data at one place, systematically organized.

Joining different tables in database user can choose interviewees according to the needs of one particular comparison and to compare the results by all different criteria. There are two groups of criteria for selection of results. The first group contains criteria based on information about interviewees given in the Data Sheet. The following criteria belong to this group: Country, Nationality, Research Sector, Category, Degree Level, Age Range and Family Status, Fig. 4. Criteria from the second group are defined by selecting the interview and questions from that interview, Fig. 5. Only the interview results which satisfy all criteria will be displayed.

Therefore, each criterion must have at least one selected value. In the cases of group interviews the following criteria are ignored: Degree Level, Age Range and Family Status. The result is list of all answers on chosen questions that interviewees, who satisfied chosen criteria, gave.

Fig. 4 Marking a criteria for comparison

To provide all these facilities and to provide fast data retrieval it was very important to make a good database design, Fig. 6. Database has 18 tables and in this moment it has more than 21,000 records.

The database consists from two parts. First one has tables that save information about interviewee and the second saves interview types, interviews and the answers on interview questions.
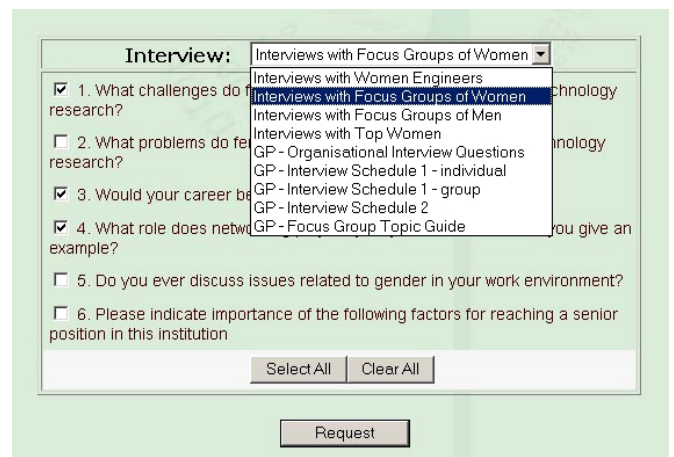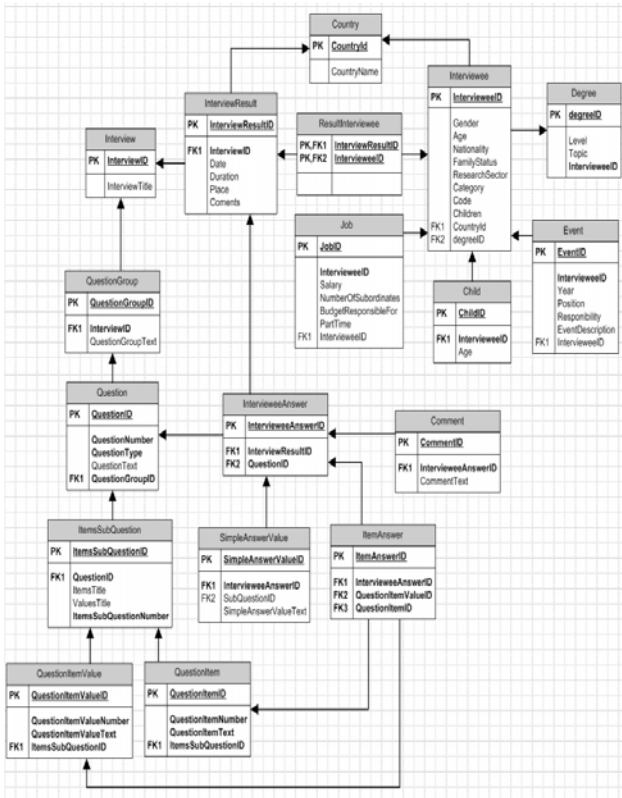
Fig. 5 Choosing an interview type

Fig. 6 Database schema

with the web applications we needed to create a friendly user interface. Web pages are design to look like questionnaires that our user made and they are systematically connected so that user can manage with the application without problems.

To summarize main advantages of using PROMETEA Database in this project are:

- Using the application independent of platform and browser
- Facilitate cooperation and communication between partners on the project
- Provide easier, more reliable, better organized and faster comparison of the results
- Fast and simple enter of information into database.

PROMETEA Database is a simple solution that helps sociologist to better organized their research and it provides a good tool for complex gender analyses

4 Conclusions

Main goal of applying internet in social science and developing a web application was to help sociologists in analyzing the results of their field work, to make their work easier and more efficient and to provide conditions for better cooperation between project partners who are situated in different countries. Considering the fact that some of our users didn't have lots of experience working

5 Acknowledgement

References:
[1] *Methodological guidebook*, PROMETEA project, Deliverable 10, 2006
[2] *Sun Microsystems, Java 2 Platform, Enterprise Edition (J2EE)* http://java.sun.com/j2ee/
[3] *Sun Microsystems, Java Naming and Directory Interface*) http://java.sun.com/products/jndi/