Service Learning in Information Science:
Web for the Blind

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Summary

The biggest problem to blind and visually impaired people poses the integration in various aspects of the social life. Since computer technology with its dominantly visual interface increasingly becomes the prime media for communication, these people are faced with a new obstacle – the ability to work on a computer and use it to communicate with others. Technologies that enable the blind to use the computer do exist, both hardware and software, but they have difficulty learning to use them. The reason for this is lack of standardized educational program so that computer education of blind is usually left to themselves and a few associations that do not have sufficiently qualified staff for such a task. Our service learning project offers the first step to possible solution of the current situation.

Service learning is a methodology where learning occurs when students apply what they learn to community problems. It was introduced into information science curriculum in the academic year 2006/07 for the first time in Croatian University with the goal to transform the old teaching style, give the final year students more place to apply the theory they learned through the study and, most important, to provide an important service to the local community.

"Web for the Blind" is the service learning project that provides a first step towards an optimal solution. The main goal of this student project was to establish an adequate model on which all future projects in this field could be based. At the moment "Web for the Blind" is a stand-alone application that provides the blind and visually impaired with the guides on how to install a web browser, familiarizes them with its interface and gives them some basic information on surfing the web. The application can be used without a mouse and with or without screen-reader software because it contains the tutorials in textual and audio format. The next phase of the project involves intensive testing in the field. It is to be presented to as much users as possible for the evaluation purpose. Finally, the contents of the tutorials need to be gradually updated in both quality and quantity.

Key words: Service learning, Educational change, Public service, Software for blind and visually impaired

Introduction

In this paper we show the results of the implementation of the new educational methodology that improves student learning productivity by linking theory and practice, more precisely, by integrating theory and social needs.

Service learning (SL) is the most common example of experiential education on university [6]. The reason for this is that it is distinguished from other approaches by its intention to equally benefit the provider and the recipient of the service as well as to ensure equal focus on both the service being provided and the learning that is occurring. Internships/practicum, on the other hand, engage students in service activities primarily for the purpose of providing students with hands-on experiences that enhance their learning or understanding of issues related to a particular area of study.

Although practicum is quite common at our university, they are also quite disliked by our students. Most of them do practicum in local government organizations, private enterprise or scientific research centres, but they say they do not benefit from it because their supervisors do not let them to employ their skills effectively, they are only given simple and boring tasks that are beneath their capabilities.

SL was never integrated as a part of the study curriculum in a Croatian university. Since practicum rarely proved to be a powerful experience for our students, in academic year 2006/07 we decided to engage our students in service learning projects that are not only enhancing their learning in particular area of study, but also providing service which addresses a community need.

Integration of service learning in information science curriculum

In the field of Information Science (IS), we integrated service learning with ICT in 12 student projects. In the beginning of the academic year 2006/07 in the De-

partment of Information Sciences, at the Faculty of Humanities, University of Zagreb [5], we included student participation in a non-profit community organization or in public primary school. We had 64 students involved in the SL activity. They started work on their projects in November 2006 and they finished it in mid June 2007.

In the first part of SL activity, our students and community members have worked together to identify community needs and to plan service activities. They also worked together to evaluate the impact of the project at the end of the academic year. There was also a control group of 6 students who performed interviews with the community partners and with each group of students and who controlled the project activities. This provided opportunities for students to voice concerns, share feelings and evaluate the project.

The following is the description of the best service learning project: "*Web for the Blind*".

In the first step of the project students contacted the association for the blind and visually impaired people "*Sismis*" [7] and offered their knowledge and expertise in the field of information science. Alliance of blind and visually impaired students "*Sismis*" is the first university institution that gathers blind and visually impaired students. The goal of the alliance is to provide easy integration for blind and visually impaired students into student and academic community, to provide them with the course material, to enhance the quality of their education and to provide the information technology support.

Talking about the members' needs it turned out that many do not have basic computer skills, and most of those who use computers, use only simple applications. Trying to change that, students decided (in cooperation with the association) to design electronic user manuals that would help the blind and visually impaired to use the Internet and adjust all software applications for the simplest usage as possible. Students realized that the "*Web for the Blind*" user manual would especially motivate those members who reluctantly approach advanced computer usage because the guide would reveal new ways of communication and would offer an approach to entertainment and useful information. The initial plan was to design only a written guide explaining how to install a web browser, how to use and adjust its interface and to give some examples of browsing through web pages.

The blind use computers by the help of a screen reader. The most popular screen reader in Croatia is JAWS, designed by the *Freedom Scientific* company. It is a high-quality and extensive tool transforming all the screen contents into descriptions read by a speech synthesizer incorporated in the JAWS as a plug-in. Speech synthesizer technology has improved on a large scale and the blind are accustomed to listening a digital voice. However, the associates from the "*Sismis*" association emphasized that it would be more acceptable and a lot better for the blind if students could record their guides with a natural voice as

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digital audio recordings. Although students did not have a professional narrator, nor professional equipment for studio sound recording, they decided to do the best they could. Furthermore, they abandoned the idea of designing a CD-ROM with textual and audio guides, since it would be difficult for the blind to search and navigate through the structure and numerous files. Instead, they decided to design an application serving as an interface that will allow users to easily approach the desired content through simple navigation.

Since their ideas developed further, their project became larger and larger, and they found necessary to divide it into sections that could be approached separately and solved individually so that the work would be done as fast and efficient as possible. Therefore, students divided the project into four main parts:

1. Definition of goals, communication with users and adjustment to their needs
2. Design of user manuals
3. Sound recording and processing
4. Application design for navigation through content

Software description

Prior to designing the user manuals, it was necessary that students, its designers, become familiar with the way the blind use computers. It turned out to be quite demanding because of the extremely visual orientation of the computer interface and the importance of mouse navigation. The blind use the keyboard (with the shortcuts) and the sound signal from the screen reader as the only means of orientation. Realizing how demanding the first step was, students decided to supplement the user manuals with a list of keyboard shortcuts for easier web browsing. The user manuals are adjusted to the users with poor computer experience in order to encompass the widest spectrum of user needs. In the user manuals, there is a step-by-step description of the screen content, screen options, and guides on how to adjust them. Although students planned to design three separate user manuals, only the first two have been completed: Mozilla Firefox web browser installation user manual and manual for getting to know the browser's interface and its' adjustment. The last would include examples and instructions for surfing through web pages, but is not finished yet. Students chose Mozilla Firefox because, according to many studies, it proved to be the most secure one, and because most of the blind using the Internet, use this web browser. Mozilla web browser has screen readers that read aloud all available information in applications and documents or show the information on a Braille display, enabling blind and visually impaired users to use equivalent software functionality as their sighted peers.

Students' goal was to design the user manuals as detailed as possible, so that the user could have a complete insight into the screen, but at the same time to keep it simple, to reduce possible mistakes. According to the first feedback information, the users are very satisfied with this segment of the project.

The next stage was sound recording of the adjusted user versions of user manuals. They are very detailed in written form, and therefore it was necessary to re-shape them in order to make the reading and the listening suggestive and meaningful. Since a professional narrator was not at their disposal, a member from student team did the demanding reading part, while the recording was done at home with minimal equipment (dynamic microphone, preamplifier/mixer and sound card). Having the output signal quite rough, sound editing was necessary. Students used the amateur audio editing tool *Adobe Audition* [1] with several supplements. Of course, they could not match the quality of audio books from the *Croatian library for the blind* [4] to which the users are accustomed to, but students think they did the maximum regarding the possibilities. The users appreciate their work and they are grateful for the achieved sound clearness and tone definition that our students are very proud of.

The last phase of the project was the design of the interface the blind would use to find and open all the existing files.

There were numerous possibilities, e.g. web pages based on HTML or Java or full applications that need to be installed on the computer. Students chose the simplest solution that enables flexibility and further updating – an independent autorun application. This made possible the whole project to be formed as a CD ROM that automatically runs as soon as put in the computer. Furthermore, users do not need to have any contact with slightly confusing file and data structure, but instead they approach all the data directly through the application. The application consists of three manuals. In the first, initial one, there are buttons for approaching Mozilla Firefox installation, audio guides, written guides, list of keyboard shortcuts with some additional information, and finally, the button to exit the application or to return to the main manual. All the buttons are linked to the keyboard keys from one to five, but it is also possible to use the mouse.

In order to ensure the complete application autonomy, each manual automatically runs the recorded speech, which lists the offered options to the user indicating which keys to use to approach them. On a button press, the speech is being stopped, and as an additional option, each manual contains a pause button also activated with the "P" key.

The application is made with the program package *Autoplay media studio* [2] designed by the *Indigo Rose Corporation* company. It is a relatively simple tool for designing similar standalone autorun applications the foundation of which is "Lua" script language. Therefore, the user only inserts the CD ROM containing the application in the computer and the automatically opened manual directs the user by audio instructions. Students think that such a simple approach is very intuitive, user-friendly and motivating for all the blind and visually impaired users.

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Implementation and research

The first version is completed and is being tested by the clients from "*Sismis*" association. Students recognized the necessity to evaluate the efficiency of the materials prepared during the academic year 2006/07 and decided to do the software update, when needed. They also intend to further adjust the application to the screen reader so that the users can select the way to use it. Also, in cooperation with other associates, students will compose the guide containing examples of navigation through the web pages that are most necessary for the users (web page of the *Croatian Association of the Blind* [3], web pages of different faculties in *University of Zagreb*, etc). Depending on the interest of the clients and associations dealing with the blind and visually impaired, this project could have a bright future and students hope that it will serve many people.

Conclusion

Considering the fact that we live in a world dominated by values of market competition, economic integration and rapidly developing technology, a world that in the same time has growing requests for promotion of national interests and culture identity, we can see that the new reality imposes an entirely new role on the education sector. Our students definitely need some skills, apart from knowledge.

When students make the connections between their service activities and studies, it deepens their understanding of the curricular material, how it's used, and why it's important. In order to truly understand the impact of the service, students need to observe the impact of the project on different participants. In the process of observing the impact of the project, they recognize the significance of their experience and assess their own learning and the impact of the project on the community being served.

Students should do service learning during their study, since it enables them to move from theory to practice, preparing them for a lifetime of learning, service, and civic engagement. It assists faculty in the transformation of student learning outcomes by strengthening course curriculum and pedagogy through experiential learning. The quality of the service learning activity is that after everything is finished, participants continue to use their new knowledge and skills to make decisions, solve problems, and grow as caring, contributing members of their communities.

Therefore, we believe it can become invaluable academic tool for Croatian students, faculty members and community in general.

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