CHAPTER 15

REDESIGNING AN OPEN SOURCE DISTANCE LEARNING ENVIRONMENT

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15.1   Introduction

An all-purpose delivery service, the Internet may soon become a universal global-ized low-cost system for delivering all kinds of information to every connected person. The possibility of content customization and the quick and easy access to this content bring new paradigms for education. Undoubtedly, the ever-omnipresent Internet is shap-ing the way we will learn: creating, enabling, delivering and/or facilitating the learning process (Preece, 2000).

Most researchers believe that electronic learning tends to be the best option if the factors under consideration are: access to courses, cost, dynamic and fresh content, scalability, imme-diate access to course updates, performance tracking, results tracking, consistency (instructor and format), retention, flexibility to learner (time, etc.), and customization/personalization.

In our knowledge-based economy, the time is right for e-learning, with political deci-sions urging the need for a stronger focus on learning. In the case of Brazil, the "Progra-ma Sociedade da Informação"[1] has started in December of 1999 with a huge initial invest-ment in order to insert the Brazilian society in the globalized information era.

Both in Brazil and globally there are many obstacles to the Internet use for education and training; in the specific case of education, some of the issues are: shortage of comput-ers, modems and Internet connection in classrooms; insufficient teacher training; funding; school budget covering Internet time; lack of interest of administrators; and lack of appro-priate content. Even then, in the context of a new knowledge-based society, countries like Brazil offer a huge potential for Internet-based lifelong education and training due espe-cially to its geographically dispersed population.

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1 Programa Sociedade da Informação – Ministério da Ciência e Tecnologia, Brasil. Available at: www.socin-fo.org.br/livro_verde/.

Only recently Brazil started to define how distance education and computer-based learning should work. New initiatives like "Projeto Universidade Aberta do Brasil"[2] represent the intent of the Brazilian government invest in new technologies for distance education as a possible way to increase the quality of education while democratizing the access to it. In this perspective, Brazilian universities are also moving towards the Internet with a focus on digital inclusion (Amorim, 2003), which leads to the development of free software[3] and to the authoring of free content.[4, 5]

Unicamp (Universidade Estadual de Campinas) was established in 1966 as a public university funded by the State of São Paulo. This university has already several projects in distance education. An online educational management system called TelEduc[6] has been developed and it is distributed in accordance to the terms of GNU General Public License. Some of the many resources (tools or functionalities) available are Portfolio, Access, Intermap, Activities, Support Material, Exercises, Bulletin Board, Discussion Forums, Chat and Mail. This distance learning environment has been integrated to the institution's ERP system in a project called "Projeto Ensino Aberto" (PEA).[7] The project involves the publishing on the Web of free content authored by the professors of Unicamp under the terms of the Creative Commons License.

TelEduc is also used in a project called "Projeto Teia do Saber" (PTS). In this case (Filho, 2006), professors and PhD students from Unicamp teach subjects that include computer based education methodologies to public school teachers using distance learning technology. PTS involves more than 1,600 teachers from schools in which the first laboratories with Internet started being available in the last few semesters.

The Web is possibly the only media allowing its users to communicate with each other directly, publicly, and instantly. Due to this, the Web allows of the development of communities almost without effort (Preece, 2000). This fact is confirmed by the emergence of new phenomena like the online community websites. New ways of collaborating, networking and interacting may suggest new pedagogical frameworks (Miskulin, and Amorim and Silva, 2005) for the transformation of learning.

Traditionally, students in online education courses do not interact with students out of their own courses due to interface limitations that do not assert teaching models involving multiple course integration. In general, this is true even when the courses are located in the same server, like < http://www.ead.unicamp.br/~teleduc/ > or < http://teleduc.nied.unicamp.br/~teleduc/ >. In other words, courses cannot easily share Discussion Forums, Bulleting Boards, Portfolios, etc. in the way they share content, a characteristic that may weaken collaborative learning involving students from the same institution that are separated in different virtual classes. In this context, this work investigates the

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2 Projeto Universidade Aberta do Brasil – Ministério da Educação, Brasil. Available at: www.uab.mec.gov.br/.

3 Comitê Técnico de Implementação de Software Livre – Presidência da República, Brasil. Available at: www.softwarelivre.gov.br/.

4 Portal Domínio Público – Biblioteca Digital – Ministério da Educação, Brasil. Available at: www.dominiopublico.gov.br/.

5 Portal de Conteúdos – Ministério da Educação, Brasil. Available at: www.webeduc.mec.gov.br/.

6 Projeto TelEduc – Congresso Internacional de Educação a Distância da ABED. Trabalho Vencedor do Prêmio de Excelência ABED/EMBRATEL na categoria Pesquisa. Available at: http://teleduc.nied.unicamp.br/teleduc/.

7 Portal Ensino Aberto – UNICAMP. Available at: www.ensinoaberto.unicamp.br/.
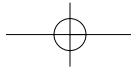
redesign of TelEduc in the perspective of online education community creation with a focus on the integration of different courses based on the same server.

A few experiences related to the usage of TelEduc are briefly mentioned in this work in order to confirm the need to redesign this environment supporting distance teaching and learning.

In conclusion, this text focuses on the redesign of TelEduc after briefly mentioning previous experiences involving the original version of this software. It intends to contribute to the discussion on how to better use computers in education while considering the Brazilian educational characteristics. This work may lead to considerations on how carefully guided sociability and skillfully designed usability may help shape thriving online educational communities based on free software and content.

15.2   Motivation

A virtual learning environment is an application developed to provide the possibility of learning with the use of ICT (Information and Communication Technologies). A virtual class is the one that utilizes ICT beyond the virtual environment with specific tools, offering opportunities of synchronous and asynchronous contacts between the actors in the educational process (Murari and Amorim, 2004).

A virtual community is a group of people with access to the World Wide Web which interact with each other sharing information, researching and promoting the distribution of software, offering services, exchanging mails etc. Distance Education is the educational situation in which the instructors and the students are separated by time and space.

Distance Education can become feasible by the use of a virtual learning environment (Nichani, 2001) such as the free software TelEduc (Rocha, 2002), which allows not only the offering of virtual classes organized by a certain methodology, but also the existence of a virtual community in which the collaborative learning is favored.

At Unicamp, more than fifty undergraduation courses like Biology, Engineering, Geography, and Medicine are offered, with around 2,500 new students each year. At PEA, TelEduc was adapted to be a virtual environment of support to the teaching-learning process available to the disciplines of undergraduation of this institution. Such environment uses TelEduc, which possesses tools to provide content and activities as well as to allow the communication among students and teachers. This utilization has suggested new possibilities to the development of TelEduc, currently also used by several other Brazilian institutions.

In the investigation of the possible redesign of TelEduc, considering social aspects and aiming at an improvement of its functionalities, certain results were obtained (Oeiras and Rocha, 2001), that indicated the importance of the incentive for the collaboration, thus allowing the exchange of experiences and knowledge. In special, such results (Oeiras and Rocha, 2001) showed that it is necessary to minimize the sensation of loneliness common to the courses via Internet by creating a space in which people involved may know each other and establish their "identity and reputation" within that group.

The importance of such space of sociability is evident in the analysis of "phenomena" like Orkut[8] or MySpace,[9] virtual communities created with the objective of helping their members to make new friends and keep relationships. It is, in a sense, a great data base about who is friend of whom, in such a way that systems like these might also be named "social networks". In this sense, there is a gathering of a group of individuals with mutual interests that exchange experiences and information in the virtual environment. Amorim, Rocha et al. (2006) indicate that Brazil is the country with the highest number of members at some virtual communities. The offering of spaces where students can meet and affirm their "identity and reputation" within the groups with mutual interests is still a subject scarcely explored in the Brazilian academic literature of the education supported by the Internet, especially due to the tendency of separating students by courses in projects such as PEA.

The results described in the literature (Oeiras and Rocha, 2001) highlight that the valuation of the possibility to exchange messages in the synchronous mode in the space reserved contrasts with the conception of the TelEduc design, in which every interaction that occurs in the communication tools is registered and can be analyzed. In TelEduc, such conception aims to help the instructors to following-up of the students, giving the latter important elements to decide on the moment of intervention, for instance. Therefore, the inclusion of a new tool in the TelEduc with some functionalities of the ICQ, for example, could bring educational benefits; however, the possibility of exchanging messages in the synchronous mode in the reserved space may bring implications in the design of other tools and in the conception of TelEduc as a whole. In this case, for reasons of consistency, the remaining tools should have their sharing capabilities reviewed. It is also evident the importance of the concept of "awareness" (Oeiras and Rocha, 2001), referring to the user's ability to keep some level of knowledge of the situation and the activities of the others.

In the case of PEA, traditional disciplines are normally separated in groups (classes) organized as different courses (virtual classes) hosted by the same server, remaining totally apart. The reason is that the environment has a course access authentication procedure. In order for instructors and students to access a course they are required to provide personal identification (login) and a password each time they access the environment. These passwords are supplied when they register in the environment. The consequence is that the resources available to students and instructors, like Bulletin Board, Discussion Forums, Chat, Mail, etc. cannot be shared between courses. Thus, even if teachers of a course want their students of distinct groups to interact in a community, looking for collaborative learning, the creation of this community is compromised by the current impossibility of sharing the resources (tools or functionalities) available (Amorim, Rocha et al., 2006).

The situation described has made teachers of courses such as Electrotechnics (Murari and Amorim, 2004), that have several classes with more than 300 students in the same semester, to chose to allocate all their students in only one space when they want to promote common activities that allow and/or favor the collaborative learning and, eventually, facilitate the monitoring of the great amount of students. In this case, the TelEduc is used, but in a server distinct from PEA, which has the students automatically separated by classes; such separation is automatic for PEA given the integration of TelEduc to the institutional ERP system.

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8 Orkut – Orkut online community website. Available at: www.orkut.com/.

9 MySpace – MySpace online community website. Available at: www.myspace.com/.

However, if all these students of the same institution follow common disciplines like calculus or physics separated by courses in the same PEA server, a simple change in the system interface should be enough to provide "shared spaces" for the students of different courses, following the criteria defined by the teachers in charge. Such spaces could be determined by the sharing of the TelEduc resources, like Bulletin Board, Discussion Forums, Chat, etc.

An alternative solution was used in a project called "Projeto Ciências Humanas" (PCH), the first partially online course provided by Unicamp to more than one thousand public school teachers of São Paulo State, Brazil, during the years 2005 and 2006. This experience (Amorim, Silva and Bellotti, 2006) showed the need and the value of Distance, Flexible and ICT-based Education for teachers. The PCH course was offered for the first time with around 400 students in 2005; in 2006, the course had 600 additional students from many cities. The inclusion of computers classes with a focus on basic digital literacy demonstrated the importance of adapting the course planning to ensure the expected learning levels. The alternative solution found for 2006 was to divide the 600 students in 15 groups at TelEduc (T01, T02, T03, etc.) as usual but also to enroll all of them in a large interaction group ("Geral") with all students and all teachers from Unicamp so that cooperative learning would happen through discussion forums, etc.

The next sections describe the prototype of a system of support to the distance education that incorporates the concept of virtual communities. Such prototype was conceived as an extension to TelEduc (Rocha, 2002). Under this perspective, the sections refer mainly to the concept of communities and of the conceptual model relative to the redesign of the TelEduc, in order to present subsequently the new design and the description of the interactive prototype. In the end, we make the final considerations and the propositions of future work.

15.3   Virtual Communities and Education

The Internet originated to a new model of community that incorporates the idea of virtual interaction: new models of communication are now possible, in a context in which a great number of people may communicate with each other in equal conditions. This situation contrasts with the traditional models of mass communication ("broadcasting") such as radio and television.

The number of virtual communities in the Internet was significantly increased in the last years. This type of community offers a great opportunity for interaction among people in the whole world. The virtual communities provide an appropriate environment for people with mutual interests to communicate, regardless of their geographical locations.

Although the Internet offers a great deal of information, the virtual communities allow the human element to act. In distant education, students may study in the comfort of their homes, but this solitary job may be discouraging, especially when one needs help with a task. When one studies in community, the learning becomes more appealing, and acquires a social dimension that benefits its members in various ways. From this concept comes the perspective of group learning, in a collaborative way.

In the literature (Amorim, Silva and Bellotti, 2006), important considerations are made on how virtual communities can be created. Points of contact, such as forums, chat rooms and mailing lists, can become available to the users. Another important concept is
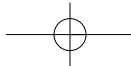
the profile. The availability of the users' profiles allows, as seen at TelEduc, members of a community to know the activities and the interests of one another. Each user must include his/her profile as they wish, according to certain rules.

Such type of interaction allows a very interesting infra-structure for educational applications, being an alternative way of interaction for courses, groups of students, teachers and universities. Another excellent possibility is the mutual cooperation and sharing of experiences among students of the same subject in different places and in different courses.

There are evidences in the literature (Preece, 2000) that the virtual communities may have a crucial role in giving support to the interaction among students and/or teachers. The downside would be that many students may never meet their colleagues personally, which can be disturbing if we consider that learning is, or should be, an intrinsically social process. Anyway, the virtual communities may add inspiration and sense of community to education. With the Internet, the teachers assume a new role as advisers, with the function of guiding the students to meaningful learning activities, instead of just providing information. Therefore, the major question to the educators is how to better use the Internet to promote education.

Preece (2000) points out that, in the case of distant learning communities, students should be encouraged to support each other. This helps to maintain them connected and involved, being an excellent source of feedback, which solves at least in part some of the well-known problems of the distance education. In virtual educational communities, most of the educators promote the constructivist learning, which advocates that the learning should exist through the social interaction and through the exploration and construction of the knowledge in authentic and meaningful contexts of the real world. This notion can be summed up in the formula "relate-create-donate": students collaborate with each other in order to create something ambitious and new that might be useful for other people outside the classroom.

Sheard (2004) pointed out a preoccupation with the lack of pedagogical base for the use of virtual communities in an educational environment. In this perspective, it is proposed a model for support to learning for communities. Such model discusses the interactions between teachers and students in this community and the use of tools like discussion forums. The conclusion is that communities of support to learning can have most of their content provided by their own students, as the teachers play some key roles in the process, such as the establishment and the maintenance of the community.

We defend in this work that virtual communities are actually extremely relevant to the current technological setting, especially regarding the educational applications. Besides, other opportunities for the development of new systems are contemplated, integrating pedagogical needs of an undergraduation course to an enriching and motivating experience of learning for both students and teachers.

15.4   Conceptual Model

The purpose of this section is to define and analyze the conceptual model of a redesign of the TelEduc (Rocha, 2002), adding educational values and functions of interaction to the initial specifications and implementations of this free software.
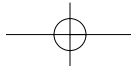
New functionalities were idealized (Amorim, Rocha et al., 2006) by the knowledge of the functionalities already offered by TelEduc with the intent to occasionally allow a more effective interaction among the groups of courses; the contemplated perspective was of a more qualified educational dynamism in the exchange of ideas among groups of interest. Such ideas are regarded as virtual communities among courses and their main characteristics will be used in order to enhance the collaborative learning in the current TelEduc. The aim is to take the best advantage of the uses of this system, as well as to ensure a better adequacy to the mental model of the final user in a system of distance education in the interaction among the several interests generated by the subsequent or complementary learning actions. The free software TelEduc was the central element of this study, yet certainly the concepts approached here are extendable to similar environments.

The main characteristics and functionalities to be integrated to the TelEduc environment will be described below; we highlight that comparisons with the existent original functionalities will be made. In this sense, we seek to enhance the necessary requisites to the viability of the proposed model.

In the proposition, communities among courses in TelEduc should provide the sharing and the exchange of information between two or more courses, or in a more generic way, two or more actions of learning. Communities with educational purpose can be created from special interests, with their organization being inherently linked to the existent courses, complementing their function of research and interaction, gathering the function of sharing of researches made by students. In this case, these communities not only should allow the participation of members belonging to the founding courses or related to the community. There may be one or more communities by association between two or more courses. The existence of the community will be associated to the offering of the courses that belong to it.

The creation of communities, in this purpose, should be made only by the coordinator of a course authenticated in the TelEduc, which receives the function of moderator and the responsibility over the educational characteristics of the community. This function can be transmitted to another member of the community, but only to another instructor of the TelEduc. By the definition of the TelEduc community, this will be created with all the participants of the associated courses. Students that are forbidden to take part of the community should be removed by the moderator, who is the creator of the community, or by the instructors of associated courses.

Functionalities already existent in the TelEduc should be available also for communities by association among courses and with the same access permissions and restrictions based on the profile of the student and/or the instructor.

Access to TelEduc should be restricted to the members properly registered and to the participants of the current courses, which should be made by the use of a mechanism of access verification. The users portfolios should have new options that allows sharing items with their communities. It is necessary to develop a functionality that allows the creation of an open forum common to the members of the communities.

The functionality of the chat room should be altered in order to attach figures and files of any extension during the chat sections. Files will be attached as links that, when activated, start the opening or the download of the file. Figures and images will be presented along with the chat room.

The functionality of the "general portfolio of the community" should allow the inclusion of content automatically visible to all the members of the community. Items already included in private portfolios, with visibility regarded as "general" should be automatically included in the general portfolio of the communities in which the user take part of. This functionality is associated to the creation of a group community, shared by all the courses associated to the community. The creation of other groups in the community should also be allowed to moderators, with the automatic creation of a portfolio with the access restrictions existent in TelEduc.

15.5   New Design of the TelEduc Environment

The new TelEduc design (Amorim, Rocha et al., 2006) is strongly based in the concepts of usability and navigability. The usability concept foments the capability that presents an interactive pleasant system to be operated efficiently, in a given context of tasks realization. The navigability concept is linked to the usability, because it considers the people-interface interaction; it is extrinsic and emphasizes the relation of the user with the medium, the computer.
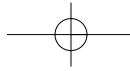
Therefore, the colors already existent, the fonts, the presentation of menus and toolbars and titles, the functional aesthetic pattern were maintained in this purpose in order to assure the identity and competence attained by the users, which ensures the ability to act in behalf of the known activities and the previous knowledge acquired. Due to that, the new functionalities implemented in the prototype of the distance learning system adjust to the conceptual model of the environment, except for the color, which required a change to allow more vivacity.

Although not demonstrated here, screens were elaborated to the various tools that compose TelEduc. The prototype elucidates the theoretical basis regarding the construction of interfaces with the users, virtual communities and distance learning, and exposes the articulation between theory and practice. The navigation through the new introduced functionalities, by the elaborated pages, can be known through diagrams and other documents available in the Internet in technical reports and on published papers (Amorim, Rocha et al., 2006).

15.6   Final Considerations

It is well-known that people with mutual interests tend to form communities. Such fact is evident nowadays in relationship communities, in which people utilize different Internet tools to gather in a natural way. In education, this affirmation is still valid, as indicated by the several communities created around forums of discussion on different themes. Technology has a fundamental role in this context, not only ensuring that the interaction among members of a community is efficient (Amorim, Silva and Bellotti, 2006) but also assuring the creation of a knowledge base.

Different institutions have chosen to use environments of support via Internet for teaching and learning (Nichani, 2001). However, these virtual environments frequently fail to allow students of different courses to share "spaces" that are naturally shared in the "real world". After all, in the "real world", it is easier and simpler to share a Bulletin Board among students of different classes in a university, for instance, contrasting to the limita-

tions of the access through a password in a network based environment. This situation makes almost impossible exchanges between these students, regardless of the interest of the teachers.

In this sense, this work intended to indicate the relevance of the reflections on the possibilities of the concept of communities in the educational context (Amorim, Silva and Bellotti, 2006), highlighting how an environment of support for teaching-learning may assure that different courses share resources. An interactive prototype (Amorim, Rocha et al., 2006) was presented and discussed to demonstrate the advantages of the proposed approach.

We hope that this study will bring new elements to the reflections on learning methodologies in a perspective of an even more efficient utilization of the technology now available. Future work could consider the creation of communities involving students from different institutions that cooperate with Unicamp, whether on national or international level.

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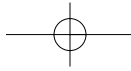
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