Chapter XXIII
E–Learning and Solidarity: The Power of Forums

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ABSTRACT

This chapter explores solidarity as a social dimension in the context of e-learning and the Semantic Web. Its aim is to explore where the students show more solidarity with each other—in online learning environments or in offline settings? In the context of this chapter, the term “solidarity between students” means the sharing of useful resources between group members. Online forums are the major Web service that we shall use to support solidarity online. In online forums, we can ask complex semantic questions knowing that someone will understand the meaning of the question and hopefully will give us a good answer to it. Add to forums the possibility of annotation with metadata and we can also depend on them to retrieve meaning rich historical information. The research is based on case studies with focus groups conducted with Portuguese higher education health students.

INTRODUCTION

The Semantic Web is a very promising project to add computer-processable meaning to World Wide Web’s documents. In its higher ambition, Semantic Technology would enable computers to process the meaning of things without human intervention (Berners-Lee, Hendler, & Lassila, 2001), besides the initial question or search query. For instance, a person might ask the computer to find in the Web, the contacts of all (amateur) tennis players from his/her own town, in order to find a playmate. With nowadays Web technology, it would be very difficult to solve this search query, although it makes perfect sense to a human being. That is, if we ask a question like that to a person—particularly a tennis player—probably we would get a complete answer. Why is that? Because that
person knows descriptions and relationships of things, like “plays tennis”, “lives in town A” and “has the phone number B”. The Semantic Web project intends to annotate information with those kinds of descriptions and relationships.

In learning contexts, the Semantic Web’s benefits are even more valuable, because they will help to achieve one of the main goals of learning—to perceive the meaning of educational subject matters (Devedzic, 2006). For instance, an undergraduate student might want to find out if there are any papers of descriptive nature in a certain research domain. If the answer is ‘yes’, he/she can gain access to the concepts’ descriptions in order to conduct his/her study at a higher level of research knowledge (correlational or experimental). If the answer is ‘no’, he/she knows that his/her research study must be conducted at an exploratory level of knowledge.

These kinds of meaning rich queries are still far from being adequately answered by computers alone, not only because the annotation process is very time consuming (imagine the entire Web scale), but also—and mostly—because there are different and conflicting approaches to implement the Semantic Web (Iskold, 2007a). At the present time, it is much easier to ask complex semantic questions in online forums. This is because we know that our post will be read by a large number of interested persons in that subject—the members of the forum—and that someone might know the meaning and the answer to our specific question.

So, this chapter will emphasize the power of forums in the promotion of a very important social dimension in the Web-enabled learning process—solidarity. In other words, this chapter will explore the extent of solidarity that students tend to share with each other, when using electronic learning (e-learning), in our case, in higher education. Although e-learning environments include several interactive activities, such as blogs, chat rooms and wikis, we shall focus the discussion on online forums, due to its flexibility of use and natural sharing characteristic, which makes them ideal for supporting solidarity.

In a nutshell, the purpose of this chapter is to discuss the presence or absence of solidarity in e-learning environments. In other words, where can we see more solidarity between students, in online learning environments or in traditional education? In the context of this chapter, the term “solidarity between students” means the exchange of information among fellow colleagues or sharing useful resources for the learning experience of other classmates. The analysis has focused on undergraduate health students, which have initiated their first year of higher education in the 2007/2008 academic year, from a Portuguese private polytechnic school.

Chapter’s Organization

This chapter starts by describing the dichotomy machines vs. humans of semantic technologies, in order to set the reference for the rest of the chapter, in the human-based Semantic Web.

After that, we depict the historical evolution of e-learning as a successor of distance education and we describe the various types of interaction that were identified during that process of evolution. In the end, emphasis is given to the learner-learner interaction, without which the solidarity between students cannot take place.

Following, we focus our attention on online forums as one of the most widely spread solutions to support interactivity in online learning environments. We describe the various types of forums and which ones stimulate increased participation from students.

Then, we move on to explore the concept of solidarity and its implications for the field of education, to end up the background section of this chapter.

In the main focus of the chapter, we present an exploratory research study which recently has
opened the discussion about e-learning and solidarity. This study has presented a list of myths and realities to whether solidarity between students was more frequent in e-learning environments or in traditional education. Following, we describe the steps of a case study with focus groups as our methodology to confirm the results of that previous exploratory research in the field, and we present our findings relative to the forums’ ability to increase solidarity in e-learning.

In the end of the chapter, we discuss future and emerging trends of Semantic Web with relation to e-learning and solidarity; and we end up with the overall conclusion of the topic.

SEMANTIC TECHNOLOGIES: MACHINES VS. HUMANS

The majority of information currently available on the Web is very difficult to process automatically. This is because Web content was mostly aimed to be interpreted by human beings (is represented in natural-language that computers cannot understand nor interpret its meaning). Hence, Web pages up until now tend to focus primarily on document structure and document presentation. Little or no attention is given to the representation of the semantics of the content itself, i.e. the (domain-specific) representation of the subject of the document (Ossenbruggen, Hardman, & Rutledge, 2002).

The main objective of the Semantic Web is to produce documents with content that is processable by both humans and machines (Berners-Lee et al., 2001). Despite the progress made, there are a few important issues that need to be put in place in order to achieve that goal. Devedzic (2004) groups them in four categories: languages for the Semantic Web, ontologies, semantic markup of pages on the Semantic Web, and services that the Semantic Web is supposed to provide. Some—if not all—of these items were covered in previous chapters of this book. So, this chapter will skip the technical details and will concentrate in the dichotomy machines vs. humans of semantic technologies.

With respect to the semantic markup of pages, that is, annotating Web information with descriptions and relationships of entities in order to add computer-processable meaning to the Web, there are two main approaches to the Semantic Web—the classic bottom-up approach and the new top-down one (Iskold, 2008).

The bottom-up approach is focused on annotating information in pages, using languages for the Semantic Web such as RDF (Resource Definition Framework), and ontologies to define the relations among terms. It consists of including tags in Web pages that reflect the meaning of the page content. These hidden labels (tags) can be generated in two possible ways. One is having an algorithm that automatically produces RDF descriptions from the page content (for instance, its text). The other way is for people to annotate existing documents with the help of visual applications that then generate RDF from those annotations. Both ways are questionable. If there is already an algorithm capable of annotating the Web, semantically and automatically, why worry about semantic languages and ontologies? Because that algorithm is still fiction, the annotation process of the bottom-up approach must be done by people. But the task of manually and coherently annotate the entire Web is overwhelming (Iskold, 2007a).

The top-down approach takes current unstructured information in existing Web pages, as it is, and tries to derive meaning automatically. To do that, vertical semantic services focus on specific subjects, like people, books and lessons, and fetch current documents on the Web in search for that particular type of information. For instance, Spock (URL: http://www.spock.com/) is a vertical search engine which scans the Web for information about people. It knows how to recognize names in Web
pages and can also identify people's attributes like birthdays, locations, and even relationships (e.g., Clinton as a predecessor of Bush). These vertical semantic services rely on algorithms just like the one mentioned in the bottom-up approach as being fiction. The difference is the much smaller scope of this top-down algorithm—it is specific of a single subject and thus feasible. However, there are also problems with this top-down approach. To start with, it is not the semantic Web envisioned by Tim Berners-Lee. Instead it is a collection of Web services that deliver added-value specific information based on simple semantic recognition. Another limitation is that the vertical service's algorithm does not always get semantics right because of ambiguities. That is, because there is no underlying RDF representation to resolve ambiguities, the top-down approach is not perfect (Iskold, 2007b).

Although both of the above approaches are making good progress, it is hard to say at the present, how long it might take before their full scenarios becomes viable (Devedzic, 2004). Ultimately, the Semantic Web will be composed by a large-scale interoperation of Web services to create a Web of machine-understandable and interoperable services that intelligent agents can discover, execute, and compose automatically (McIlraith, Son, & Zeng, 2001). But there is still a competition between Semantic Web languages and other technical aspects, and there is no guarantee about which one will prevail. In other words, there are many things in the development of Semantic Web that are only at the beginning. (Devedzic, 2004).

Summarizing this section, semantic technologies seek to be machine-dependable in a great extent, but the reality shows that there is still the need for human intervention both to include (annotate) and to extract the meaning of information on the Web. On the other hand, humans themselves can only process a small fraction of information available on the Web, and would benefit enormously if they could rely on machines to analyse and understand Web contents (Noy et al., 2001). It is this uncertain machines vs. humans dichotomy that leads us to explore a more human-based Web service such as the online forum. And that is because online forums have an inherent annotation process (the Usenet hierarchy of subjects, for instance), but its richest meaning characteristic is the human supported interaction, that is capable of answering complex semantic questions.

INTERACTION IN E-LEARNING

According to Keegan (1996), distance education is any instructional activity in which the instructor and the learner are separated by space or time. This definition requires the use of some type of medium to deliver the instructional material to the learners, as well as to support communication between the participants (Holmberg, 1995). Another complementary definition, from the UK Quality Assurance Agency for Higher Education (QAA, 2006) defines distance learning (or distance education) as “a way of providing higher education that involves the transfer to the student’s location of the materials that form the main basis of study, rather than the student moving to the location of the resource provider”. This definition is not restricted to higher education—QAA's sphere of action—but is applicable to all kinds of education. In both definitions of distance education we can easily include a variety of delivery modes according to the technologies and mediums used. That is the case of correspondence courses, audio and video technologies such as the audiotape or videoconferencing, and computer-mediated learning (Curran, 2006).

The same author has stated that the terminology which is often used to refer to computer-mediated learning varies. Computer-assisted learning (CAL) or instruction (CAI) can be defined as “any learning that is mediated by a computer and which requires no direct interaction between the user and a human instructor in order to run”. Com-
puter applications in distance education have also been referred to as computer-managed instruction (CMI), computer-based training (CBT) and more recently online, Web-based or e-learning. These last ones are greatly enriched by interaction functionalities as we shall see. Some examples of e-learning technologies are: the Internet and World Wide Web, email, synchronous and asynchronous computer-mediated communication applications (such as online forums or chats), and interactive multimedia applications on CD or DVD-ROM.

In terms of interaction between the participants, the historical evolution of distance education from correspondence courses to e-learning has shown a remarkable progress in terms of interpersonal interaction. As stated by Woods & Baker (2004), early correspondence courses have enabled the interaction between learners and instructors, although with a significant delay between message production and reception. Videoconferencing made it possible for learners to interact with each other and with instructors, but the high cost of the required equipment often made this technology prohibitive to support distance education. It was only with the emergence of the Internet, and particularly due to the widespread of cost-effective technologies such as email and the World Wide Web, that interpersonal interaction became a reality in distance education.

Why, in general terms, is interpersonal interaction important to the success of distance education and to the success of e-learning in particular? The answer is that learning and teaching are primarily about interaction: interaction between learners and instructors, between learners themselves and between learners and the course material (Moore, 1989). That is, high levels of interaction, particularly those which promote social engagement, can have positive effects on the learning experience (Harasim, 1995; Rovai, 2002).

But let us return to Moore’s categorization of interaction in distance education: learner-content, learner-instructor, and learner-learner.

Through learner-content interaction, the student processes the course material, in order to assimilate the knowledge and practices that are being transmitted during the educational experience. This implies that each learner may interact very differently with the same course material, because he/she has to construct his/her knowledge through a process of personally accommodating information into previously existing cognitive structures. In a great extent, that construction of knowledge happens by interacting with content (Moore, 1989). Translated into e-learning, this first type of interaction has been addressed (to a certain extent) by the development of interactive courseware, such as interactive multimedia applications on CD-ROM or simulation programs that are available on the World Wide Web.

Through learner-instructor interaction, the instructor and students communicate with each other, not only in formal instructional discourse, but also in informal dialogues or in offline communication that occurs during the educational experience (Woods & Baker, 2004). Adapted to e-learning, this second type of interaction usually occurs via synchronous and asynchronous computer-mediated communication, such as email, online discussion forums or chat rooms.

Through learner-learner interaction, students communicate with each other, either on an individual basis or on a group basis, and with or without the real-time presence of an instructor (Moore, 1989). Usually, this inter-learner interaction is an extremely valuable or even essential resource for learning, depending on some factors such as age, experience, and level of learner autonomy. For example, younger learners will benefit from peer-group interaction, in terms of stimulation and motivation to study, although this is not so important for most adult and advanced learners, who tend to be self-motivated (Moore, 1989). In the field of e-learning, this third type of interaction is supported by the same applications that were mentioned in the learner-instructor interaction. We
must, however, keep in mind that in both types of interaction involving persons in both ends, there may be offline forms of communicating besides computer-mediated communication. That is the case of telephone and face-to-face conversations among members of a class or other group that occur during the progress of a course.

The learner-content, learner-instructor, and learner-learner are the three traditional categories of interaction in distance education. However, as Moore & Kearsley (2005) have stated, e-learning is a changing paradigm, that is perpetually evolving, non-static, and dynamic. Hence, as an outcome of subsequent research in the area, other types of interaction have emerged, such as learner-interface, learner-environment, teacher-teacher, teacher-content, content-content, and learner-context. These six issues are beyond the scope of this chapter but we redirect the interested reader to Woods & Baker’s (2004) article about interaction and immediacy in online learning.

In this chapter, we are particularly interested in the last of Moore’s categories of interaction—the learner-learner interaction—because the two-way communication between students themselves is a pre-requisite for the existence of solidarity between them, as we shall see in the Solidarity section.

**ONLINE FORUMS**

There are several alternatives to support interaction in online learning contexts (Woods & Baker, 2004). Blogs, chats, wikis and forums, to name just a few, are examples of common tools to develop learner-learner interaction or learner-instructor interaction. This section describes the most popular online interaction tools, giving emphasis to forums due to its flexibility of use and natural sharing characteristic, which makes them ideal for supporting solidarity.

Known as “the new age diaries”, Web logs—or blogs by contraction of those two words—are a form of online journal with one or many contributors (Duffy & Bruns, 2006). Unlike traditional diaries, which are of a personal nature, blogs are a very accessible and intuitive way of publishing content online. Even though they can also be private, the majority of blogs is used to share content with some community (e.g. of students). Ideas, discussions, trends and learning materials, are some of the content that can be published on a blog, knowing that interactivity between sender and receiver is guaranteed to be very intuitive.

A chat is an activity that is used to establish a written conversation in real time. It is a synchronous communication tool, i.e. it allows an immediate exchange of messages between several participants. A chat application can be the basis of a virtual classroom if the access to the chat room is limited to the students enrolled in a class (Peters, 2008).

According to Tonkin (2005), a wiki is an activity that is used by several participants in order to collaboratively create an electronic document about a certain subject. Wikis have the following characteristics:

- All the pages are connected by links and each page can contain several links to other pages;
- All participants can edit existing pages as well as add new pages to the wiki;
- When a participant edits a wiki page, a new version of it is created and old versions are not eliminated, allowing its retrieval at any time.

An online discussion forum is a powerful communication tool in the context of e-learning. A forum is a sort of online messages board where teachers and students can post new messages and respond to existing ones. Being an asynchronous communication tool, students can take all the time they want preparing a new message or an answer before posting it to the forum (Thomas, 2002). This is why online forums are one of the most widely
spread solutions to support interactivity in online learning environments, and also the reason why there are so many research studies (Cavallaro & Tan, 2006; Freiermuth, 2002; Warschauer, 1996) which have concluded that students are more likely to participate in an online discussion forum than in a classroom discussion (face-to-face).

Forums are quite simple to set up and operate in online learning platforms, and the communication occurs at the students’ convenience. That is, they can access and contribute to the forum literally anytime and from anywhere there is a computer with an Internet connection (Cavallaro & Tan, 2006). However, this ease of use is not sufficient to assure student’s participation. As Dool (2007) states, “not all online discussions are created equally”, and he identifies three types of online discussion forums: the “Question & Answer (Q&A)” model, the “1-plus” model, and the “dialogue intensive” model.

The “Q&A” model is the most common type of forum. Typically, the teacher posts a specific question that is related to the unit’s topic and the students are required to post an answer to that question (Dool, 2007). Usually, the forum can be configured to show all the answers to each student only after he/she submits his/her response to the forum. In this way the teacher increases the critical thinking of the students and at the same time, allows the sharing of their approaches and perspectives in response to the specific question. However, interaction between students and with the teacher is very limited, as there is only one question and several «isolated» answers to that question. The primary value of this “Q&A” model is not to promote the discussion but to encourage the sharing of ideas among the classmates.

In the “1-plus” model, each student not only has to answer to the specific unit’s question that was posted by the teacher (like in the “Q&A” model), but he/she must also post at least one comment to his/her peer’s postings. In this way, the teacher also promotes the learner-learner interaction (besides the sharing spirit), but normally, the majority of students tend to post the mandatory one response to a peer’s posting, so the discussion energy tends to dissipate (Dool, 2007).

The model which promotes the most of interaction, both learner-learner and learner-instructor, is the “dialogue intensive” model. In general, the teacher posts an initial discussion question that is related to the unit’s topic and asks the students to share their own experiences, personal opinions, as well as other documented source materials that are related to that question. The teacher himself must also engage in the discussion in order to extend the contributions, not only by challenging students to clarify their points of view, but also to set the quality and quantity method of discussion grading (Dool, 2007). If well set and understood by students, a good discussion grading method will encourage active participation in the forum (e.g. 10+ quality posts to get an A).

Although the “dialogue intensive” model contributes to the most interactive forums, all three models aim to empower the sharing spirit among a learning community. This was the purpose of our case study, to leverage on the power of forums to promote solidarity in e-learning. And as we shall see in the next section, solidarity is mostly about sharing, and all three models, including the “Q&A” which was implemented in our case study, have a natural sharing characteristic, ideal for supporting solidarity.

**SOLIDARITY**

Maybe due to the Latin origin of the word (Wiktionary, 2007), ‘solidarity’ is rarely seen in English texts. Writers tend to use other words like ‘sympathy’ instead. But ‘sympathy’ is not quite the same as ‘solidarity’ and therefore this introduction will help understand the following citation. “No one can be sympathetic alone. Solidarity is a social fact.” (Perrenoud, 2003). This sentence has several implications to this chapter. Firstly, we must study the concept of solidarity to the light
of sociology, hence the reference to Perrenoud, a renowned sociologist in the field of education. Secondly, we must have learner-learner interaction (two students at least) in order to support any kind of solidarity that may exist between them. Finally, the third implication is more semantic in the sense that, from now on, we shall use the term ‘sympathetic’ with the meaning “characterized by solidarity”.

Perrenoud (2003) defines solidarity primarily as a human value, a value that each and every person can achieve in his growing process as a human being and that tends to influence his behaviour towards the others and the surrounding community. Behaviours like sharing, helping and supporting other people, accepting the difference of others, integrating, protecting, taking care of, concern, and so one, are the reflections of that value into concrete actions. But “neither these practices, nor the values that underlie them occur naturally in the development of the human being. Solidarity is not spontaneous, it is a victory against egocentrism and selfishness that characterizes a young child, but also against the ethnocentrism of every human group and the priority it gives to its own interests. Solidarity is a social and cultural construction, a fragile achievement of civilization.” (Perrenoud, 2003).

In other words, if we first assume that the typical human being is selfish and just cares about himself, it becomes clear that many people will only form or join a group for something which they cannot get (as easily) by themselves. This is the basis of group solidarity as it was defined by Hechter (1988), and it measures the group’s capacity to influence its members’ behaviour. The more solidarity there is in a group, the greater the influence it casts upon its members. Groups influence their members by subjecting them to a variety of obligations to act in the corporate interest and by ensuring that these obligations will be fulfilled.

So even being unnatural to the human nature, solidarity can be established, especially in small groups (like a school class), where the students share common individual interests (inter-dependence) and there is no need for controlling the solidarity compliance as in larger groups. This way, greater commonality of individual interest, results in more solidarity within the group. And when a group member gets from the group more than he has expected, then the solidarity will also be larger. That results in the most stable (or solidarity) groups, which can satisfy its members’ needs (Hechter, 1988).

From what has been said, Hechter (1988) adds that pro-social behaviour—such as altruism and helping behaviour—is likely to emerge in the absence of any controls at all, based on the selection mechanism or repeated exchange. But he admits that the common knowledge basis that is needed to sustain the cooperation is unlikely to be available in large groups. For instance, in a large corporation, some agency of the group must have the ability to monitor the members’ behaviour and to provide sanctions to reward the compliant and punish the noncompliant to the group’s solidarity. So, formal controls are necessary for the attainment of solidarity in large groups.

Because solidarity is unlikely to happen spontaneously (particularly in large groups) but at the same time it is possible, there must be some conditions for the development of solidarity in a society. Perrenoud (2003) has presented three conditions that must be continuously met:

1. The principle of solidarity should be part of the ideas and core values of most individuals;
2. There must be some form of reciprocity, at least in the medium term;
3. Solidarity is not always given in advance; it is achieved at the expense of individual and social struggles.

Let us now translate the above three conditions to the field of education, knowing that formal education itself, in our schools, can play an important role in the promotion of solidarity.
The first one—basing solidarity as a value and ethical principle in our society—makes perfect sense although it is hard to measure such a subjective concept as a human value. Even so, school can contribute to the development of solidarity as a value by teaching it as a value, not in the abstract, but through examples drawn from human history, from current news and events, and from literature. But even more important, showing and promoting solidarity through practices: between students, between teachers and students, between parents, between teachers, or between the school and its surrounding community. In other words, school can contribute to create a moral conscience in the students that makes them think twice before doing some selfish—and hence, not sympathetic—act (just like the environmental awareness has already produced some effects in the waste recycle and reduction) (Perrenoud, 2003).

The second one—understanding solidarity as a social contract—is needed to justify why we should be sympathetic when it seems that solidarity «does not pay». No human being can live alone, outside of any community. Belonging to social groups, from family to the global society, is a principle not only for our material survival, but also for our identity, intellectual development and emotional balance. Thus, the symbol of the contract helps us to clarify the roles of education: 1) lead a person to understand that he/she is part of a team and that he/she cannot leave the game without weakening his/her own interests; and 2) encouraging to conceive solidarity not only as a humanistic value, but mainly as a practical condition for the survival of a society (Perrenoud, 2003). Instinctively, each student in a class (traditional or virtual) has the expectation of receiving back, even after some time, the benefits of a contribution that he/she makes to the class today (for example, some useful resource). The instructors can play an important role by encouraging and modelling this behaviour from the beginning of a course, thereby creating a safe learning environment of acceptance and trust. Activities that enhance sharing and cooperation can further develop openness and solidarity within groups.” (McDonald & Gibson, 1998)

The third one—learning to fight to increase solidarity—derives from the fact that solidarity is not spontaneous in any society. Therefore it must be continuously nurtured by the people who have already understood and internalized the two previous conditions. Those persons are the same ones, who fight for more democracy, more equality, more respect for the human rights and differences, and so on. By fighting those battles they are preparing the ground for the development of solidarity. So, training for solidarity is preparing critical individuals who are willing and able to become actors, to defend their interests, and to explain and control the mechanisms that cause violence, poverty, and exclusion. This requires not only economic, legal, technological, scientific, and sociological knowledge, but also analysis, negotiation, coordination, tactical and strategic skills. Once again the education system plays an important role in providing those skills and knowledge (Perrenoud, 2003). In our opinion, teachers should be the main actors in the battle for solidarity in the classroom. Not only by teaching the above information but also by setting the example and showing the way to their students, emphasizing the fact that solidarity is worthwhile for the entire group. For instance, a teacher who posts useful articles in a class forum or who makes encouraging comments to the progress of his/her students is setting the pace in a sharing spirit and partnership among the class members (Carvalho, 2007).

Now that we have more deeply analysed the concept of solidarity in general terms, it is easy to accept the definition of “solidarity between students” as the exchange of information among fellow colleagues or sharing useful resources for the learning experience of other classmates, in order to help and support the group. As examples we may refer to: helping a classmate to complete an assignment, posting an article of interest to
the group, answering a question or doubt of a colleague, and so on.

E-LEARNING AND SOLIDARITY: MYTHS AND REALITIES

In a recent research study, we have found out that students tended to express more solidarity with each other in online learning environments than in the classroom (Jesus & Moreira, 2008b). For conducting that study, we have made available for higher education students, a course that was delivered in a blended-learning configuration. Blended-learning (or b-learning) is the use of more than one strategy or delivery system for learning (Shoniregun & Gray, 2003).

In our case and through a cross group experimental design (Jesus & Moreira, 2008a), students had access to:

- traditional classes (2 hours once a week);
- paper-based support material;
- the lessons recorded in electronic media (a CD-Rom with screencasts); and
- an online learning environment (based on a Moodle platform).

A screencast is a digital recording of computer screen output, including mouse movements and clicks. Also known as a video screen capture, screencasts can include audio narration to explain the process that is being documented by the screencast (Peterson, 2007).

Although the term screencast is relatively new (2004), products like Lotus ScreenCam were already available in 1993 (Kumar & Govindaraju, 2007). However, the first screencasting applications generated very large files and were limited in their functionalities. More recent applications, like Camtasia Studio (http://www.techsmith.com/camtasia.asp) already support more compact file formats like Macromedia Flash, and have lots of functionalities allowing the video sequence editing, the audio editing (both a human voice and the internal computer sound), and the mouse movements editing.

Screencasts are typically suitable to demonstrate “how to do” computer tasks, because unlike traditional classes which can be taped with a regular video camera, or even an audiotape, classes which focus on computer screen data require a better recording quality in order to clearly visualize and listen to the computer output. Usually, regular video cameras cannot achieve that quality.

Due to the large size in bytes, the screencasts with the lessons were distributed to the students in a CD-Rom, instead of being delivered over the Internet. The students’ reactions to those screencasts were very encouraging as well as productive in terms of learning outcomes (Jesus & Moreira, 2008c).

According to Cole & Foster (2005), Moodle is an open source learning management system (LMS) that is used by all kinds of schools and training companies to add web technology to their courses. Moodle is currently used by more than 10,000 educational organizations around the world to deliver online courses and to supplement traditional face-to-face courses. Moodle is available for free on the Web (http://moodle.org), so anyone can download and install it.

A LMS includes several e-learning tools, both to deliver content materials and to support communication among users. The former can be achieved by interactive lessons, simulations or static documents (e.g. in PDF format). The later can be supported by forums, chats and instant messaging, among others.

In the market there are several LMS to choose from, both commercial and open source. Figure 1 shows some examples of LMS implemented in Portuguese organizations. As we can see, Moodle, which is an international open source project, is responsible for 57% of all platforms installed in Portugal. Following Moodle in the chart, we can see two commercial LMS developed in Portugal—Teleformar.net and Formare—and another inter-
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national open source project called Dokeos, with around 5% of market share each. The remaining solutions included in the chart are all commercial LMS available internationally.

The reason for the success of Moodle in Portugal is due to the initiative of a public state foundation—FCCN (Scientific Computing National Foundation)—who gave training and technical support to several school IT staff and teachers, to operate with Moodle, particularly in the primary and secondary levels of education.

In the context of Higher Education in Portugal (see Figure 2), Moodle is still the leader in LMS installations, and with a tendency to grow, but with only 32% of market share. This reduction in comparison with the previous chart, is due not only to the inflated contribution of primary and secondary education to the Moodle dominance in Figure 1, but also to the widespread of solutions implemented by universities, the earlier adopters of LMS.

In the Moodle platform used in our research study we were particularly interested in three types of solidarity expressions exchanged between students: 1) the number of supportive forum posts; 2) the number of one-to-one help messages in the instant messaging system, and 3) the number of help messages in chat sessions. To examine those online solidarity expressions we have used log file analysis, whereas to examine the students’ sympa-

Figure 1. Percentage of market by LMS in Portugal (adapted from (DeltaConsultores, 2007))

![Figure 1. Percentage of market by LMS in Portugal](image)

Figure 2. Percentage of LMS use in Portuguese HE Institutions (adapted from (DeltaConsultores, 2007))

![Figure 2. Percentage of LMS use in Portuguese HE Institutions](image)
thetic behaviours in the classroom we have used the researcher’s participant observation, which has consisted of note taking whenever he has perceived that a student was helping a classmate to complete a requested task or assignment.

In a nutshell, in that study (Jesus & Moreira, 2008b), we have seen more than twice as much students’ sympathetic behaviours in the online environment than during the classroom sessions, for what have contributed the online forums that were set in the Moodle platform. In order to justify the study’s findings, we have presented a list of reasons which we have called realities and myths, as shown in Table 1 and Table 2, respectively.

Table 1 summarizes a set of issues that really justify why there is a tendency to exist more solidarity in online learning environments than in traditional classes. The first two of them are of social or behavioural nature, in the sense that e-learning environments promote different social behaviours among students, when comparing with face-to-face classes. The last two of them are of technical nature, in the sense that e-learning environments make it easier to share resources online than offline, by not having so many technical constraints.

Table 2 goes over a number of topics that mistakenly lead us to believe that solidarity is more

### Table 1. Realities of increased solidarity online

<table>
<thead>
<tr>
<th>Traditional Education</th>
<th>e-learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>More outspoken students tend to participate more, including sharing resources with their peers.</td>
<td>Students feel more protected by the online learning environment, which also leads usually reserved students to share resources with their peers.</td>
</tr>
<tr>
<td>Students socialize face-to-face to help each other.</td>
<td>Students do not socialize face-to-face, and this leads them to develop compensatory ways to help each other, such as sharing resources online.</td>
</tr>
<tr>
<td>Resource sharing is limited to the periods when students are physically together (is not continuous in time).</td>
<td>Resource sharing can happen on an ongoing basis (including during school holidays).</td>
</tr>
<tr>
<td>Resource sharing is not so simple: the resource’s owner has to lend it over to a classmate for a period of time, normally to photocopy it.</td>
<td>The growing virtualization of knowledge, makes it very convenient and fast (and also ecological), to share resources online (e.g. via copy/paste).</td>
</tr>
</tbody>
</table>

### Table 2. Myths of increased solidarity online

<table>
<thead>
<tr>
<th>Traditional Education</th>
<th>e-learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students share resources, primarily, outside the classroom and there are no logs.</td>
<td>There are logs to register the exchanges of resources.</td>
</tr>
<tr>
<td>Therefore, maybe it is a myth to consider solidarity more frequent online than offline, simply because it is easier to keep track of it online.</td>
<td></td>
</tr>
<tr>
<td>There is an atmosphere of competition among students (Who participates more? Who is more popular?).</td>
<td>As the name of its author is registered, the sharing of resources is a similar way to gain notoriety in the group.</td>
</tr>
<tr>
<td>So, the motive behind the contribution is not solidarity but recognition and popularity.</td>
<td></td>
</tr>
<tr>
<td>A student cannot as easily (nor at once) reach all his classmates.</td>
<td>There is a tendency to ask for help even before exploring the solutions to a problem.</td>
</tr>
<tr>
<td>So, maybe there are more expressions of solidarity online simply because there are more requests for that to happen than in traditional classes.</td>
<td></td>
</tr>
<tr>
<td>Students already know traditional classes for years.</td>
<td>For the majority of students, online learning environments are a novelty and it is natural that they want to explore all the functionalities of the platform.</td>
</tr>
<tr>
<td>Thus, some of the sympathetic messages and posts are written not only to help other classmates, but also to try out the forum, the chat room or the messaging system.</td>
<td></td>
</tr>
</tbody>
</table>
frequent online than face-to-face. All these myths but the second are of technical nature, in the sense that e-learning environments make it easier to keep track of things and to share resources online than offline, by not having so many technical constraints. The second myth reflects an existing social behaviour (in traditional education) that is still maintained by the students in online learning environments, but in an adapted and more disguised way.

In summary and although the above findings are of exploratory nature, they have contributed to a better understanding of the relations between e-learning and solidarity. In the next section, we shall describe a new case study as our methodology to confirm the results of that previous research in the field. In this case, emphasis will be given to the forums’ ability to increase solidarity in e-learning.

FORUMS AND SOLIDARITY: A CASE STUDY

In order to confirm the tendency for increased solidarity expressions in online learning environments, we have conducted a case study during the second semester of the 2007/2008 academic year. According to Yin (2003), a case study is an empirical inquiry which investigates a specific phenomenon, in a specific group, in order to answer specific questions holistically.

One of the researchers and author of this chapter is the professor of a health research course whose participants are first year students from the Instituto Politécnico de Saúde do Norte (IPSN, a Portuguese private higher education school; URL: http://www.cespu.pt/pt-PT/ensino/ensino_politecnico/). The course aims to prepare students from several educational areas—Pathological Anatomy, Podiatry and Dental Prosthesis—to conduct research projects in their fields. With a conventional 2-hour lecture per week and a course management system (an online learning environment) to support the course during and between classes, the unit of Health Research takes place in a fully equipped classroom with personal computers and broadband Internet connection.

In this case study have participated 158 students—Pathological Anatomy (n=62), Podiatry (n=42) and Dental Prosthesis (n=54)—that were split into several groups so that each class had an average of 26 students. The students were faced with the following scenario, which was created by their professor:

Let’s help our fellow Brazilians!

I have a friend who teaches at a high school in Brazil. His students are about to choose their higher education areas and many of them would like to follow health courses. So he wants to do a project with those students, to help them decide which health areas to follow. In order to do that he asked me for help, because he knows that I am already a lecturer of health students. I thought it would be a good idea to involve you in helping out those young Brazilians.

The idea is to collect as much information as possible about the health area, to compile a thematic dossier. I shall deliver that dossier to my Brazilian friend in the first weekend of May, when he comes to Portugal. Therefore, I ask you to bring me, until the end of April, some of the following materials:

- Health website addresses,
- References on the subject,
- Notes (may be photocopies),
- Health glossary terms,
- Leaflets or brochures,
- Magazines or journals,
- Etc.

You can deliver the material, both in paper-based documents (in my school postal box or personally in class), or in electronic format (by posting the
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information on the forum that I have set for this purpose in the Moodle platform).

On my behalf and on behalf of the young Brazilians which we are helping, I thank you in advance, for all your cooperation!

The students were given 10 days to contribute to this “solidarity campaign”, but only if they wished to do so. The professor has explicitly informed the students that there was no obligation to contribute, and that the task was not included in the unit’s assessment plan. Also, the forum that was set up for collecting the students’ contributions was of the Q&A type. Hence, it was not of the type which stimulates the higher participation from students. This was intentional. We wanted to distinguish the authentic sympathetic behaviours from the ones that were identified in Table 2, as mistakenly leading us to believe that solidarity is more frequent online than face-to-face.

On the other hand, the very same students who were invited to contribute to this “solidarity campaign” had already to accomplish a similar task in the beginning of the semester. That is, each student had a week to post in a Q&A online forum, the research objective of his/her project for the semester, but that time, the task was part of the unit’s assessment plan. So, this scenario was mainly set up with the goal of comparing the number of sympathetic contributions in the online forum and in the offline alternatives. But we also wanted to compare the number of contributions in the not assessed online forum vs. the assessed one.

The findings of the case study are based in the online learning environment’s log files—number of forum posts—and in the counting of paper-based documents delivered to the professor.

The online learning environment’s log files were stored and utilised for analysis after removing all individual identification data in order to protect the research subjects’ privacy. The participants were informed of that practice prior to the beginning of the study, and signed a consent form approving that method.

Table 3 summarizes the number of students’ sympathetic contributions by the end of the “solidarity campaign” both online and offline. As we can see, there was nearly half sympathetic contributions offline in comparison with the ones that were made online. These results confirm the findings of the exploratory case study that we have discussed in the previous section. That is, students tend to express more solidarity in online mediums than in offline ones. Also, as we have expected, there were more contributions in the assessed online forum than in the solidarity forum (not assessed). But the difference between both forums is relatively small, which allows us to conclude that: 1) we are in the presence of a truly sympathetic group of students; and 2) forums are really very easy to operate and, hence, have the ability to promote sympathetic behaviours.

The next step of the case study was to confirm the myths and realities that were identified in the previous section. To do that, this research utilised focus groups as a method to collect the opinions of the students who have participated in the “solidarity campaign”. A focus group is an interview with a group of persons in order to capitalize on the synergy of the group interactions. But it is not a freewheeling conversation among group members; it has focus and a clearly identifiable agenda moderated by the interviewer. Its main purpose is understanding and interpreting group members’ experience (Stewart, Shamdasani, & Rook, 2006).

In this case study, focus groups were conducted in the week immediately after the solidarity campaign’s deadline. This timing was chosen in order

Table 3. Number of students’ sympathetic contributions

| Paper-based documents delivered | 47 |
| Posts in online forum (not assessed) | 99 |
| Posts in previous online forum (assessed) | 149 |
to minimize the problem of the students forgetting the experience that was being discussed in the focus group. Also, we have decided to conduct three focus groups: one with three students who have only contributed to the online forum (called ‘OF3’ from now on); another with three students who have contributed both online and offline (OFPB3); and a final one with two students who have only delivered paper-based contributions (PB2; only these two students did that).

Each focus group’s agenda had three main questions:

1. Why have you contributed to the “solidarity campaign”?
2. Why did you opt to contribute with posts in the online forum or with paper-based documents?
3. Do you identify yourself with some of the following myths and realities about e-learning and solidarity? [see Table 1 and Table 2 above]

Focus Groups’ Results

The responses of the interviewed students to the focus group’s questions were basically the following (the order is just for later reference):

1. Why have you contributed to the “solidarity campaign”?  
   1.1. “Because I have identified myself with the young Brazilians’ situation. A year ago, I would also appreciate this kind of help.”  
   1.2. “Because I already had the material to hand over without much effort.”  
   1.3. “Because you [the professor] asked us to do so.”  
   1.4. “Because I thought it was a good way to complete my daily ‘good deed’ (sort of).”  
   1.5. “Because I would like that some of the young Brazilians will follow the same health area as I did.”  

2. Why did you opt to contribute with posts in the online forum (OF) or with paper-based documents (PBD)?  
   2.1. OF: “Because it was easier to find online materials than paper-based ones and I find it easy to post in forums.”  
   2.2. OF: “Because my paper-based documents were at my parent’s house and I only went there last weekend [after the campaign’s deadline].”  
   2.3. OF: “Because I did not want to loose my paper-based documents.”  
   2.4. PBD: “Because we went to a congress recently and had lots of leaflets and brochures to hand out.”  
   2.5. PBD: “Because it was easier to make copies of my notes than to scan and post them to the forum.”

3. Do you identify yourself with some of the following myths and realities about e-learning and solidarity? [see Table 1 and Table 2 above]
   3.1 In general, all the groups have agreed with the four realities of Table 1. However, they have disagreed with the last myth of Table 2 (stating that the use of e-learning tools was not so difficult) and had some reluctance in agreeing with the third myth (stating that they are not lazy to find the answers to their questions). More details in the next four paragraphs.

It is not surprising that responses 1.2 and 2.4 were given only by the PB2 group. These students have identified themselves right away with the last reality of Table 1. They have delivered the paper-based materials due to a coincidence—they went to a congress a few days earlier and the materials they have collected there were still in the bags to organize later. They have also pointed out the first myth of Table 2 as the one that they agreed most.
Responses 1.1 and 1.4 (or similar) were cited by all three groups of students. Response 1.5 was given by the groups OF3 and OFPB3, which have also identified themselves right away with the last reality of Table 1. As a matter of fact, they have stated that the contributions they have posted to the forum were made via copy/paste of their own course materials. These two groups have identified themselves equally with the first two myths of Table 2.

Responses 1.3 and 2.5 were given by the OFPB3 group of students, which agreed right away with the first reality of Table 1, and with the second myth of Table 2 (not so right away, but in the end they have admitted that recognition played its part in their sympathetic contribution).

Finally, responses 2.1, 2.2 and 2.3 were cited by the OF3 group, which identified themselves equally with the last two realities of Table 1 and with myths no. 1 and no. 3 of Table 2. As an example, a student from this group has stated that she had some very good paper-based materials at home, but that her parent’s home was too far away from school to go there just for that. Another student said that she wanted to help the young Brazilians but was not in the mood to spend some money in order to make copies of her paper-based materials.

In a nutshell, and with regard to the realities of Table 1, although the focus groups have agreed with all of them, they have confirmed very explicitly the last one: “The growing virtualization of knowledge makes it very convenient and fast to share resources online”. As to the myths of Table 2, focus groups have only agreed with the first three of them—leaving out the fourth one: “Some of the sympathetic messages and posts are written not only to help other classmates, but also to try out the forum, the chat room or the messaging system.”—and they have confirmed very explicitly the first myth: “Maybe it is a myth to consider solidarity more frequent online than offline, simply because it is easier to keep track of it online.”

The focus groups have also referred a few times that the forum was an inviting and easy way for them to contribute to the “solidarity campaign”. They have found very useful to witness the materials that other students were posting, in order to guide them in their contributions and to avoid repetitions. Also, they have stated that this campaign was useful not only to the Brazilian students, but to enrich themselves with new and varied knowledge. More than simple information, they have considered that some of the posts—that they have called “experts-type”—included very useful and to the point knowledge, difficult to collect just by doing a Web search.

**FUTURE TRENDS**

After analysing the current state of the art of the Semantic Web it becomes clear that there is still the need for human intervention to derive knowledge—or information with meaning—from the Web. That was the reason that led us to explore a more human-based Web service such as the online forum. Although some online forums—the newsgroups—have an inherent annotation process—the Usenet hierarchy of subjects—online forums would gain much more meaning, if we could include additional metadata in order to improve searches and other information retrieval techniques.

The idea of annotating messages with RDF descriptions is not new. Quan, Bakshi & Karger (2003) have already proposed the development of a well-defined ontology for messaging based on the RDF. Those authors have proposed ontological specifications of how to represent messages, conversations, and people (senders and recipients) using RDF Schema. Their goal was to support for unified messaging in the context of the Semantic Web. That is, to assemble as conversations with meaning, the messages exchanged regardless of the communication channel: e-mail, Internet relay...
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chat (IRC), newsgroups, instant messaging (IM), and news feeds.

We agree with that proposition and envision the annotation of online forums (newsgroups and others) as a major development to amplify the importance of forums in the Semantic Web’s era. With metadata attached to the forum posts and the ability to rely on human supported interaction, not only online forums could be used to ask new complex semantic questions, but also we could depend on them to retrieve meaning rich historical information.

With respect to solidarity in e-learning environments, in general terms, and the forum’s contribution to amplify it, in particular, we foresee a major increase in the use of dialogue intensive forums. In its essence, this type of forums can stimulate increased participation from students, by encouraging the exchange of personal experiences and meaning rich information. Dialogue intensive forums provide the perfect environment to achieve socially constructed knowledge and the exchange of sympathetic behaviours, but there is a lack of empirical studies to confirm that.

At the same time, our past research studies regarding e-learning and solidarity, have indicated that blended-learning seems to be the best modality of e-learning in order to increase the sharing spirit and partnership among the class members. And that is because blended-learning tends to maximize the benefits of both arguments while minimizing their disadvantages. For instance, reality no. 1 of Table 1 applied to a blended-learning situation, allows the more outspoken students to participate mostly in the classroom, and the more reserved students to participate mostly in the online environment. In addition, students who feel respected and understood tend to be more open, cooperative, constructive, acceptant and responsible. Therefore, the normally quieter students that gain recognition by sharing resources online probably also tend to gradually participate more in the classroom.

Another reason that leads us to consider blended-learning as an ideal solution to promote solidarity between students is that the sharing of written resources is best suited for online environments, but the sharing of some “how to do” practices is best suited to be conducted in face-to-face environments. So, further research is necessary.

CONCLUSION

This chapter has explored a very important social dimension in the context of two overlapping areas for our study: e-learning and the Semantic Web. That social dimension was the extent of solidarity that students tend to share with each other in Web-based learning, in our case, in higher education.

We saw that semantic technologies lack substantial developments in order to support an automated exchange of sympathetic behaviours among humans. That is because solidarity is a human value which makes it very difficult to be processed automatically by machines. As of that, we have turned on to a more human-based Web service, as is the online forum.

In online forums, we can ask complex semantic questions, i.e. we can post to a large number of interested persons in our subject—the members of the forum—knowing that someone will understand the meaning of the question and hopefully will give us a good answer to it. Add to forums the possibility of annotation with metadata and we can also depend on them to retrieve meaning rich historical information.

With regard to e-learning and solidarity, in both studies that we have conducted we found out that students tended to be more sympathetic with each other in online learning environments than in offline settings. In other words, we have seen more sharing of useful resources between group members in online environments than in
offline ones. For that increased solidarity online have contributed, in a great extent, online forums that were set to support the students’ sympathetic contributions. Forums are really very easy to operate and, hence, have the ability to promote sympathetic behaviours. But that was not the only conclusion of our second study. We have also concluded that our cohort is a truly sympathetic group of students. This and a good discussion question with which students identify themselves (as was the case), justifies the generous contributions, both online and offline.

This second study has also confirmed the majority of reasons that have justified the increased solidarity online in the first study. That is, the realities and myths about e-learning and solidarity. More specifically and in the students’ opinion, the findings of the second study have emphasized one reality and one myth as being more important than the others. The former is: “The growing virtualization of knowledge makes it very convenient and fast to share resources online”. The later is: “Maybe it is a myth to consider solidarity more frequent online than offline, simply because it is easier to keep track of it online.” Although this myth is believed to be true, we still think that it is not enough to level things. That is, we have evidence which lead us to believe that solidarity is more frequent online than offline, even though it is harder to keep track of things in the offline world.

REFERENCES


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KEY TERMS AND DEFINITIONS

Blended-Learning: Blended-learning (or b-learning) is the use of more than one strategy or delivery system for learning.

Complex Semantic Questions: Search queries that require the understanding of descriptions and relationships of things in order to be answered.

Dialogue Intensive Forum: A forum where the moderator posts an initial discussion question that is related to a certain topic and asks the users to share their own experiences, personal opinions, as well as other documented source materials that are related to that question. In the context of e-learning, the moderator is the teacher that sets a minimum of participation from the users, which are the students, in order to promote an intensive interaction.

E-Learning: Any learning that is mediated by a computer and which requires no direct interaction between the user and a human instructor in order to run.

Learner-Learner Interaction: Two-way communication between students, either on an individual basis or on a group basis, and with or without the real-time presence of an instructor.

Online Forum: A forum is a sort of online messages board where users can post new messages and respond to existing ones. Being an asynchronous communication tool, users can take all the time they want preparing a new message or an answer before posting it to the forum.

Solidarity: Solidarity is as a human value that every person can achieve in his growing process as a human being and that tends to influence his behaviour towards the others (e.g. sharing, helping and supporting other people, integrating, protecting, etc.).

Solidarity Between Students: The exchange of information among fellow colleagues or sharing useful resources for the learning experience of other classmates, in order to help and support the group.