PIAZZA – A TOOL FOR CLASS DISCUSSION. BENEFITS OF ITS USE AND FUTURE REQUIREMENTS

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Abstract. Email lists, news feeds or bulletin boards are widely used as communication tools for university classes. Although very useful, these tools have their limitations, as they do not really enable collaboration between users. Forums or online discussion groups try to address these limitations by creating ways of user interaction. Even so, general purpose forums are not particularly suited for university class use, one of the main reasons being that they simply do not attract students, when it comes to matters of school or learning. It is all about that communal atmosphere among students and instructors that online tools have to recreate, where people can come together to share knowledge and ideas, just as in real life. Also, online educational tools have to observe the fulminate success that social networks enjoyed and try to somehow recreate and target that success on useful directions. This paper presents some conclusions on a specific tool, named Piazza. After a semester of using Piazza for classes at Petroleum-Gas University of Ploiesti, the author notices a few distinctive features that make this tool an improvement over classic forums, encouraging participation and simplifying collaboration between the students and between students and instructors. Briefly, those are: students can post questions (even anonymous, for the shy ones), can respond to other student's questions (or maybe even their own, if they figured it out latter) and the instructors and TA's have the possibility to respond or endorse good responses (or questions); each question has a single students' answer that students can contribute to, and a single instructors' answer that instructors can contribute to; wiki-style Q&A; embedded math formula editor (that supports LaTEX) ; display of changes, updates and online users in real time; mobile application support; many useful reports. Of course, like for any software product, there are also ways of improvement: maybe that anonymity option isn't always a good idea; it lacks translation for languages as Romanian; at some point the security code for a class didn't allow enrollment, even it was correct. But these are minor and easy to fix problems. And, behind all of these, Piazza has a romantic and beautiful story.

Keywords: Collaborative Learning, Computers and Education, Piazza.

1. INTRODUCTION

Nowadays, computers are an important part of our world. Communications and information technology changed the way we work, learn, interact, travel, and spend spare time and many other human activities. Today we generally own more than one computer (PCs but also tablets, e-book readers, smart-phones, game consoles etc.), communicate on the mobile phone, make payments on the Internet and so on. The goal of technology is or it should be to enable us have a better living, do things better (and maybe do better things). And this is the way computers should be used, not as a simple purpose, instead as a mean to achieve better productivity and quality in everyday activities.

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From this point of view, we are getting close to a particular human activity, namely learning. Learning is not only a human activity for itself, but especially a process that prepares subjects to do other future activities. It then comes natural that people, on one hand, learn how to use computers and, on the other hand, use computers in the learning process. Here by computers we understand all specific features provided by the information and communications technology that may apply to the domain, resulting in what is called technology enhanced learning, e-learning or computer aided (assisted) learning.

2. COMPUTERS AND EDUCATION

Some authors consider that "e-learning is emerging as a new paradigm of modern education"[1]. Other authors argue that "there are extensive links between developing educational theories and practices that had shaped the use of E-learning over the past 40 years. In the Higher Education, Business, and Training sectors the concept of e-learning relates particularly to Internet-based flexible delivery of content and programs that focus on sustaining particular communities of practice.[..] The origins of E-learning as currently practiced in Business, Higher Education and the Military stem from the insightful work of Patrick Suppes [2] at Stanford and Don Bitzer [3] at the University of Illinois" [4]. So the premises of e-learning were established more that 40 years ago and there were the advances of technology that enabled those principles nowadays to be applied.

In support of opinion that e-learning is not a recent preoccupation come also the standards that were created by regulation bodies [5]. IEEE Learning Technology Standards Committee (LTSC), Working Group 12: Learning Object Metadata, created a standard to specify the syntax and semantics of Learning Object Metadata, defined as the attributes required to fully/adequately describing a Learning Object. Learning Objects are defined here as "any entity, digital or non-digital, which can be used, re-used or referenced during technology supported learning" [6]. Another important collection of standards in the field is the Advanced Distributed Learning (ADL) Sharable Content Object Reference Model (SCORM) [7] that specifies the form of interaction between a client and a Learning Management System (LMS) [8]. There are many topics related to the computer and education problem, that include design and development of digital educational content, platforms and authoring tools, knowledge management and learning, semantic metadata for e-learning, educational virtual environments, ubiquitous learning environments, mobile learning environments applications, remote and virtual laboratories, collaborative learning. In this article we mainly focus on one of this technology enhanced learning mechanisms, Computer Supported Collaborative Learning, and a specific free online tool for this task, namely Piazza [9]. We analyze our experience with this tool based on a seven points feature list commonly agreed on for this type of platforms.

3. COLLABORATIVE LEARNING

Collaborative Learning is "a general term used for the description of educational practices based on the simultaneous cognitive and mental effort of multiple students or/and educators" [10]. This type of learning is computer supported by collaborative e-learning virtual environments (CVEs). There is a set of common features that were identified for the CVEs: [11] different roles and rights for the users of the environment; not a simple virtual space, but a communication space with permits interaction; different forms of representation, from text to three dimensional graphics; active space which encourages user interaction; integration of various technologies; support of various e-learning scenarios; the environment should try to recreate features of the physical space.

There are educational theories, such as constructivism or social learning, sustaining that knowledge is socially constructed [12]; from this point of view, collaborative learning can lead to better results than individual learning. Of course, eventually learning is an individual process, because it produces a change in own intellect. What the interaction among subjects can do is to generate extra activities (explanation, disagreement, mutual regulation etc.) to trigger special mechanisms (knowledge elicitation, internalization, reduced cognitive load etc.) that facilitate the assimilation of knowledge, additional to those triggered by individual learning (induction, deduction, compilation etc.). "Peers do not learn because they are two, but because they perform some activities which trigger specific learning mechanisms" [13].

4. INCLUSIVE E-LEARNING

Our point of view is that learning should be a guaranteed human right, equally accessible to anyone. Unfortunately, at the moment this desiderates is not achieved. Simply put, not every person can obtain the desired, or, considering the possible native qualities, the deserved education. That is a well known problem and will not insist on it here. A further problem is that, even if learners managed to get access to the educational programs, some of them will still have to face difficulties such as discrimination or lack of collaboration or integration with other students. "While there is little agreement in the research literature regarding the effects of online instruction versus traditional education delivery with respect to cost, instructor time, and learning outcomes for the average student, there is general agreement that computer-mediated learning benefits the student who is marginalized or performing poorly in traditional learning environments" [14]. Right from the beginning of any class, every good instructor tries to create a communal atmosphere between students and between students and instructors. It appears that there are cases, even at prestigious universities, where this favorable learning climate is not obtained and some students get to feel isolated and frustrated. It so happened for Pooja Nath, a student at an elite Indian engineering school. She was one of the few women on campus. While her male classmates collaborated on problem sets, Ms. Nath toiled in the computer lab alone. "Back then, no one owned a laptop, there was no Internet in the dorm rooms. So everyone in my class would be working in the computer lab together," she said. "But all the guys would be communicating with each other, getting help so fast, and I would be on the sidelines just watching" [15]. Pooja Nath wanted that no other student experience the problems she did and for this reason she was motivated in creating Piazza.

5. PIAZZA – A TOOL FOR CLASS DISCUSSION

Piazza is an online platform focused on encouraging student interaction in the learning process. Teaching assistants and professors can also be an active part of online class discussions. We started using Piazza for some of our Fall 2012 classes on Computer Science at Petroleum – Gas University of Ploiesti, after reading about its success at top universities like Stanford, MIT, Berkeley or Harvard [16]. All the studied papers and online interviews with professors using Piazza indicated that it was a great tool and a definite improvement over mail or forum solutions we were applying at the moment. Piazza is a free service that welcomes any new user and does not impose any restraints (on country, university, class size etc.).

6. BENEFITS OF PIAZZA

Piazza follows the requirements stated above on Collaborative Learning Environments, briefly roles, interaction, representation, active space, integration, support of various learning scenarios and recreation of real space. We further take each of these criteria and analyze the compliance.

Instructors can create classes by specifying the university (if no other class existed before for that university or school then the university will first be created), the class name and a couple of other class details (course start date, signup link, access code, additional instructors, description of course, syllabus, lecture time, lecture location, office hours etc.). Additional instructors and the students can be added manually, based on email lists. The roles (instructor, teaching assistant and student) are assigned to users by adding them to the specific roster. Users can also sign up online, using the access code provided at the class. A particularly useful feature that we found is cloning classes (copy an entire class).

Piazza was created with interaction in mind. The experience of its creators with Facebook and Google had a word to say. "We want to empower people to ask and answer questions, and we're going to measure every aspect of it. Piazza's own metrics are promising. The average user, according to the company's data, spends two to three hours a day on the site. The reason for the intensity is very similar to the reason for Facebook's growth" [17]. Students can post questions (even anonymous, for the shy ones), can respond to other student's questions (or maybe even their own, if they figured it out latter) and the instructors and TA's have the possibility to respond or endorse good responses (or questions). Each question has a single students' answer that students can contribute to, and a single instructors' answer that other instructors can also elaborate.

As means of representation, Piazza provides simple text, colored text, different color for instructors' messages and a wiki style questions and answers interface. There is also an embedded math formula editor that supports LaTEX, so the accuracy of math representation is very good.

Piazza is an active platform in encouraging participation, it displays the number of currently online users and online users for that week and sends activity digest emails based on user settings. Also the display of changes and updates is done in real time. However it does not provide a real time chat and we believe that is a good idea because real time chat tends to very easily divert from the subject (which is study, of course).

It what concerns integration with various technologies, Piazza can be linked with major Learning Management Systems as Blackboard, Moodle, Sakai, Desire2Learn, Canvas, Jenzabar or Angel. We haven't done yet integration with our LMS (Moodle) but plan do to it shortly. Moreover, Piazza provides mobile application support, which means that a mobile application is available in mobile app stores to be downloaded and installed on mobile devices as smart-phones or tablets. With the large spreading of such devices, mobile app support tends to be a must for every software Internet platform.

There are a few learning scenarios that can be put in show with Piazza. First of all let's think of that dutiful student that is caught by the middle of the night with one apparently impossible to grasp study problem and asks for help on the platform. At that late hour of the night, instructors are probably sleeping, but a classmate of the student is awake, responds and enlightens him. Another learning scenario is that of an instructor launching a question for all the students that starts a public contest (with a white ball prize), stimulates competitive spirit and encourages students to learn and understand. Everyone knows that you completely understood an issue if you are able to explain it to someone else. Piazza might come in handy even in the evaluation part of the learning process, when an instructor credits student involvement in online class discussions.

The name of the tool, "Piazza" comes from the Italian word "plaza", a square of the city where people meet and share knowledge and ideas. This is exactly what the tool aims at, namely recreation of that communal atmosphere among students and instructors, a climate of learning and mutual support.

7. MORE EXPECTATIONS

We first entitled this experience sharing paper "Advantages and disadvantages of using Piazza", but that would have been an unfair title, because we haven't found any notable disadvantage of using this tool. Of course, that doesn't mean we don't have some further expectations from Collaborative Learning Online Tools, like Piazza, and we state those as we above stated the benefits, based on the chosen criteria with seven main points.

Piazza provides three user roles: student, TA, instructor. Those are the basic roles in the instruction process, but we can think of possible new other roles, like simple guests or visitors that only want to get a glimpse of that class; maybe in the groups of students there are heads of groups having organizational duties and need a special role, so the possibility to define additional roles would be a plus.

Regarding interaction channels, we believe that all necessary tools are in place. Student should be motivated [18] and willing to collaborate and learn, taking benefit of the platform.

About representation, enhanced collaboration features, allowing collaborative work on more that text based models (graphics, animations, three-dimensional etc.) would bring the platform to another level. Possibility to simulate and work with representations of objects from various fields would make the software useful for classes in many fields of study.

Piazza is an active and dynamic environment. It is still a browser based application and when user closes the browser, the application is gone. Maybe a solid client, simple and oriented to notification features, would be useful.

Integration of various technologies and support of various e-learning scenarios are well covered topics. From the point of technology used to create the tool, Piazza is a free online platform, but not an open source platform. That means the client can use the service via the Internet from the service provider site (just as we normally use Google or Yahoo Mail, for example), but cannot install the platform on own server or customize the software in any way. Piazza does not ask for any money from its users (its creators do not hurry to monetize it, yet), but it's still hosted on a commercial (.com) domain. Maybe going open source would be a good idea. There should be volunteers from the academics to continue the development of the application.

Piazza lacks translation for languages as Romanian. From the point of familiarity and recreation of real world space, students should be given an interface in the same language as the one used for the class.

8. CONCLUSIONS

As we mentioned before, Piazza began as a personal crusade of a Indian young girl student, that, being one of few girls at the University, felt marginalized during her classes and study hours and did not want anyone go through that again. Pooja Nath took contact with two contrasting cultures, Indian and American, and from here her internal fight. At the age of 22, when it seemed an appropriate time to marry, the parents prodded her into an arranged marriage. Pooja could not accept this situation, fled, divorced her husband and even left a job at Oracle. She wanted to feel free to "pursue opportunities she was more passionate about", namely the world of startups. Piazza is such a startup. Using Piazza for almost a year now

proved to be a good decision. This paper is not intended to be a complete specification of features for the software; online documentation should be perused for that. What we did intend is to share our experience and positive feeling about the tool and subscribe to the list of instructors that recommend its use.

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