Online Communication in a Multimedia Course

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Abstract

Communication is a critical component of human interaction in order to satisfy basic human needs. This is especially true in technology-supported learning environments, where establishing multiple communicational channels between instructors and students is a requisite to enhance learning. Therefore, specific intervention strategies are required to effectively adjust each channel to satisfy students' communication needs while learning. However, not all online communication channels achieve the goal of including students into their learning communities. Thus, designers should understand what works best in facilitating effective communication and learning. The bottom line lies in how to foster online communication and what impact it may have on effective learning. This paper aims at exploring student use of asynchronous and synchronous communication tools, namely fora and chat tools, and their participation within a technology-supported Multimedia course. We present ongoing research results related to this specific issue, together with implications for designing b-learning experiences, lessons learnt and future work. By this we aim at contributing to understand the impact of online communication tools on student behavior and learning results.

Keywords

B-learning, e-learning systems, HCI, asynchronous and synchronous communication, forum, chat

1. INTRODUCTION

Inclusive learning communities is a desired goal for designers of technology-enhanced leanring experiences. Feelings of isolation, high drop-out rates, insatisfaction, poor learning and low return-on-investment are still likely outcomes that must be addressed to attain equitable, educational, economical and efficiency goals [Mehlen05]. Designing tecnhology-supported learning environments, that are learner-, community-, knowledge- and assessment-centered, is a challenguing task because of the multidimensional nature of learning online [Costa05, Ander04]. Monitoring these interactions gives feedback to designers that contributes to the improvement of the people-system fit of the learning experience. This can be done by adjusting the interactivity of content and facilitating proper communication tools to address students' specific needs.

This paper focuses on the students and instructors interactions in a blended-learning experience; specifically, our main objective is to explore the relationship between online participation of students (by posting or viewing messages) and their performance regarding course project. To this end, we analyzed how these variables related during a one-semester Multimedia Production (MPC) course by looking at respective recorded system data; interpret the results identifying key issues and lessons learnt. Our main contribution is to better understand how much specific intervention strategies can contribute to student performance in online learning environments. In the remainder of this article, we present our conceptual framework, some results gathered and discuss the implications for design. Finally, we present conclusions and ideas for future work.

2. CONCEPTUAL FRAMEWORK

Online communication can be defined as an interchange of ideas and opinions [Webst93] mediated by technology. While communicating involves a sender and a receiver, a communicative act involves relevant content to both parties: one that has the knowledge or information, the other has the desire to learn or be informed. This is required to start "transmitting" messages. In online learning environments, these two roles are easily and rapidly interchanged, which suggests a distributed tutoring operating model between instructors and advanced students in subject matter, be it related to technology or knowledge domain. This is relevant to form and sustain learning communities because of the possibilities to learn interpersonal skills as well as tacit knowledge [Ander04]. This is particularly important, and effective, if e-Learning tools support this bi-directionality and also protect the exchange of information within the community. These specific traits of learning online, if not well managed, drive social isolation, high student anxiety and frustration levels, and drop-out rates [Hambu03]. But, what intervention strategies to use in order to minimize these unwanted effects and benefit from expected results of learning online?

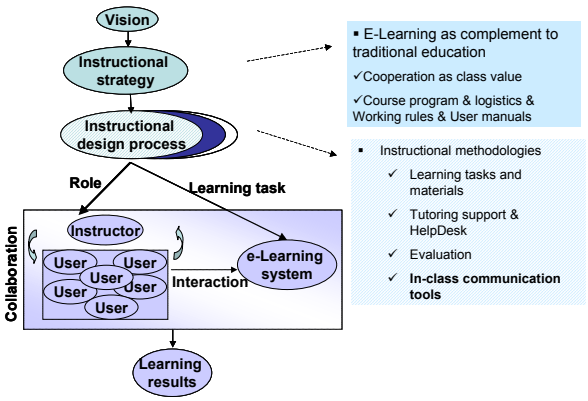

Figure 1 - Conceptual Framework

As can be seen in Figure 1, based on previous works [Rentr03:04:06], the fit between the organizational macro and micro-levels should be articulated in order to create/sustain proper operational context for learning and communicating online. This implies articulating instructional processes, people skills and system functionalities. This can be done through the proper definition of role's behaviors, responsibilities and learning tasks. This way, instructional design process frames expected learning results setting goals in context structuring interactions between learners performing specific roles and defined tasks. Since educating is mostly a matter of communicating, for the remaining part of this paper, we focus on the communicational aspects of the people-system fit within a real learning context, which normally takes place by using fora and chat rooms. By definition, a forum is a medium for public discussion; a public meeting or lecture involving audience discussion [Webst93]. This is an asynchronous way of communicating that supports bi-directionally student-instructor interactions structured around a topic of interest for both parties.

Our framework takes into account instructional strategies and methodologies and their impact on the person-computer interactions and collaboration among them in each defined learning situation. The expected usage of in-class communication tools is the expression of how instructors expect to make users feel part of the learning community and achieve instructional goals. This is because social interaction, both among students and between students and instructors, is strongly related to course satisfaction [Cont04]. In sum, there are challenges for development teams that entail looking at asynchronous and synchronous communications tools and pedagogically adjust their functions to enhance learning. In the next section**,** we describe our study methodology and results.

3. STUDY METHODOLOGY

The conceptual framework shown in Figure 1 was instantiated into a concrete academic experiment in the form of a one semester **Multimedia Content Production (MCP)** course. Our research group selected and customized an open source Learning Management System [Moodl06] together with a webcast/multimedia archiving tool [epres06], which we called SEMINOLE (*SEaMless INtegrated Online Learning Environment*). The system was designed to meet three main requirements: learning content management, class webcast and archive, evaluation methods and collaborative work. Its main functionalities were identified based on defined vision, priorities; university's teaching process and analysis of strengths and weaknesses of available LMS (Learning Management System) platforms. While registered students were automatically subscribed to all *fora,* they were able to unsubscribe at will. The system prototype was tested on MCP course last year and improved according to user and technical feedback [Rentr06]. The course was taught during spring semester (2005/06) in two campi of our university to 143 registered students.

The course is divided into practical and theoretical components with several pedagogical activities. In this paper, we present an empirical study on analyzing both synchronous and asynchronous communication methods and the overall results obtained when analyzing interactions in MPC course while students were doing a software group project (three students per group) along the semester with three deliveries. Instructor and teaching assistant lectured in a traditional way while opening different communication channels (online and offline), so that response time to answer questions/doubts concerning class administration or projects was the fastest possible. This response time was between 30 minutes - 12 hours, particularly short in deadline periods. To support the project and students/teachers interactions, SEMINOLE provides, among others: (a) discussion fora where the students can share their concerns about their course administration doubts and project requisites with peers and instructors; (b) a project chat with weekly scheduled tutoring sessions; and (c) a project WIKI where the students can iteratively and collaboratively write their project report. All learning resources/activities contemplate students' and teachers' interactions: the *fora*, as a mean of supporting asynchronous and bi-directionally the discussion of topics, the project chat with its bidirectional synchronously project-related discussion supporting laboratory sessions, and the project WIKI (a wiki is a type of website that allows visitors to easily add, remove, or otherwise edit and change some available content, sometimes without the need for registration. This ease of interaction and operation makes a wiki an effective tool for collaborative authoring) with a mostly unidirectional participation where the instructors only intervene to regularly give feedback about the project progress and report status. The project chat is available while the teacher is present at lab sessions (2 hours / class, 4 classes / week) available for both online and presential students. In addition to these online communication tools, an estimated of two hours/week was spent coaching students on their specific project concerns. All the project chat questions and answers were logged and was available online (like with the *fora*) to be consulted by any student, keeping most of the shared knowledge available to all.

Recorded system data out of 98.7% of registered students was analyzed, excluding the data from drop-out students.

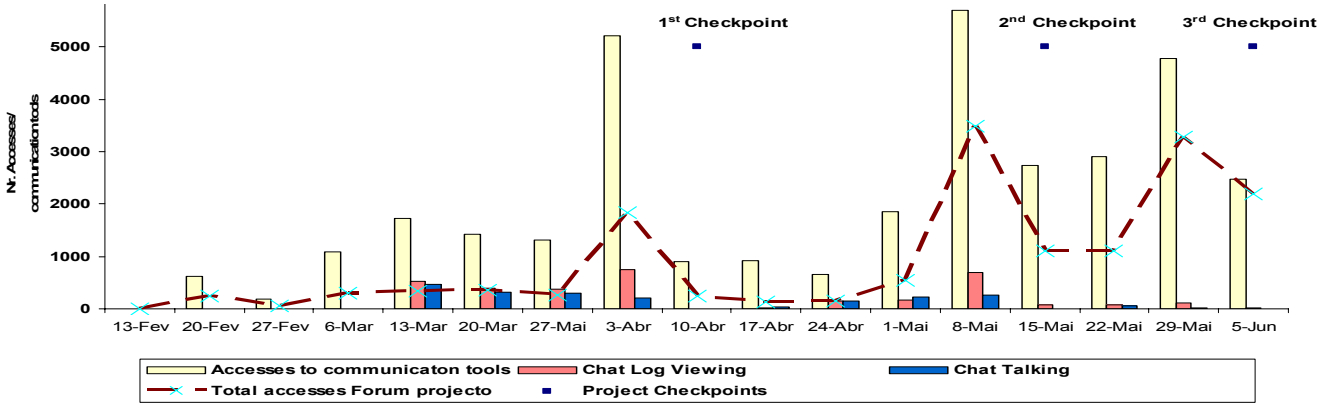

Figure 2 – Project & Thematic Resources Accesses

73% of the students are in their 4th year of a 5-year undergraduate study course. Further, 57% were registered at Campus A; the remaining at Campus B. 79% reported spending more than 2 hours/day using the Internet. 82% reported never having previously participated in a similar b-Learning experience. 58% reported to access Internet at speeds between 512 Kbps – 2 Mbps, 29% at speeds over 2 Mbps and 9% at under 512 Kbps. Almost a quarter of the students held part-time jobs.

4. RESULTS

The assumption underlying this study was that interactions in available communication tools somehow related to student's participation online. Next, results of students' participation in each available communication tool in MCP course are presented. All the students participated in the project forum adding 49 new discussions, 308 new posts and viewing 8.783 times existing posts. Regarding the project chat, 90% of the students participated, 36% talking and contributing and 60% viewing available logs. It is worth noticing that, although chat talking decrease as project checkpoints arrived, the fact is that most users preferred asynchronous resources as viewing chat logs and fora. This low-talking rate suggests that most students may not be comfortable expressing themselves online or did not believe it will work well. We can also notice that chat talking peak far from project checkpoint dates as the students use this mean with a more relaxing attitude. The restrictions over synchronous meeting, its demands on time commitments and students' expectations on their usefulness regarding learning objectives acted as an inhibitor to use chat tool at deadline points. On the contrary, asynchronous tools and instructor's availability, expressed by a fast response rate (less than 8 hours at stress points, including weekends), worked as a motivation to posting, which increase just before deadlines as depicted in Figure 2. Further studies should explore the usage of whiteboards during lab sessions as a complement of synchronous communication tool to impact learning effectiveness.

At the 6th week of the course, 55% of participating students reported to have posted nothing in existing *fora*. This situation changed in the next month after MCP thematic forum creation (Figure 3). In addition, this forum had an evaluation component performed by peers and supervised by the instructors. This forum opened three times, starting at the middle of the semester, with a new discussion every three weeks. 67% of the students posted in this forum in response to the three MCP related topics with an average of almost three posts per participating students, fulfilling the defined pedagogical goal. 33% didn't participate due to overlapping with project checkpoints and other competing course evaluations (about 73% of registered students frequented more than 5 courses on this semester).

We also set up a Q&A forum to clarify students concerns about course management. We had 43 discussions open with an average of three posts per registered student. Also, each student viewed this forum 18 times, on average. Once again instructor's estimated response time played an important role in students searching for course information and solutions to problems. On the 3rd of April, we created a social chat as suggested by students for them to socialize online. In practice, this chat was just mildly used at the beginning for students tutoring each other during lab sessions. This low usage may be related to students' concerns for privacy, existing emotional bonds among them, and low perceived usefulness of this communication tool regarding learning objectives. Next steps should explore ways to enhance its usage with class purposes.

Though the sample size is a limitation of this study, reducing the likelihood of discovery significant relationships between analyzed variables; there are two insights to further exploration. First, by looking at a 2 x 2 contingency table using project grades and. project forum access frequency, it seems that grades greater or equal than

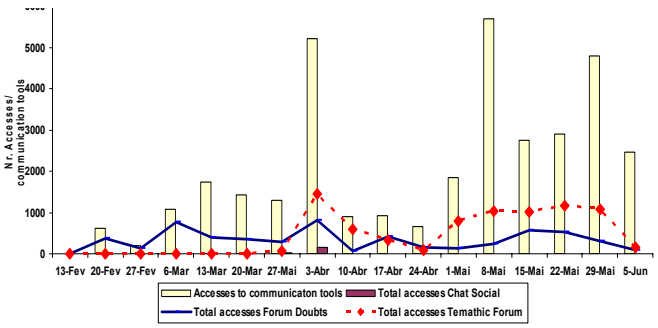

Figure 3 – Accesses to Social and Thematic Resources

15 (out of 20) may be related to accesses greater or equal to 100. Likewise, accesses below 100 may be related to grades below 15 [Montg99]. To test this hypothesis properly, further studies are required with larger samples. Second, the impact of face-to-face tutoring was relevant for learning effectiveness. During the semester, we estimated that a total 200 hours of tutoring was given on two *campi*, covering registered students at different degrees. Some students were inclined to advance in their project work by directly asking to teaching assistant in face-to-face short meetings with low online participation. Again, further studies are needed to analyze the relationship between online participation, learning and presential tutoring.

5. IMPLICATIONS FOR DESIGN

This experience entails four implications for courseware and design as identified. First, from the pedagogical point of view, presential tutoring is still a critical factor when designing technology supported learning experience. Second, availability of instructor and high response rates across all established course *fora* enhances student participation. However, there are still students with low online participation rates that require extra attention from instructors to assure class learning. Third, establishing initial rules and instructions to participate in *fora* and chat rooms helped students to form mental models about functioning and also their expectations regarding timing of response from instructors. Besides, student population grew about five times compared to last year's. This fact demanded a new working method with increased availability supported on better time management and organization skills. Considering this aspect, chat logs and *fora* made it possible for all questions and answers to be kept available as a knowledge base, which was of great value to students as shown by previously mentioned viewing rates. Also, recurring questions were normally redirected to this knowledge base as to peers knowledgeable in the subject's matter, reinforcing the notion of *distributed tutoring*. Last, but not the least, social synchronous communication should be created at the course beginning when students feel the need to meet each other (i.e. Creating project groups).

6. CONCLUSIONS

As previously mentioned, the goal of this work was to present some results from analyzing the interaction between students and instructors by using an online learning environment within a real instructional setting. We conclude that this b-learning experience was efficient and effective in two specific ways. First, a ratio of about 33 students per instructor was possible compare with 9:1 in similar course last year (excluding content production and improvements in course management). Furthermore, drop-out rate was 1.3% among registered students. Also, there was an average of 6 posts made by students per 1 made by instructors. To end, at the timing of this writing, over 90% of the students are expected to make a passing grade judging by similar patterns at a corresponding time last year. However, new issues emerged, as a consequence of this increases in the number of students, such as availability of resources (equipments and facilities), backoffice support to author and timely produce required learning contents in different formats and modes, coordination of support activities at organizational level, helpdesk, adoption of new work methods and a different skill mix in development teams. A second conclusion is that asynchronous communication tools work best to satisfy student needs as they are always available. For this to be true, responses must be timely, short and questions should be fully addressed. This way, well managed asynchronous tools can help build a rich knowledge base resource by capturing what users want to know about course management and subject matter in specific learning situations.

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