HIGHER EDUCATION: GOOGLE APPLICATIONS AND STUDENT-CENTERED LEARNING

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Abstract
Web 2.0 tools and social networking are part of our daily life activities. How about transforming social networking to educational networking, through Web 2.0 tools integration within the teaching and learning process? Employing a case study approach, the paper examines students’ perceptions and experiences regarding the use of Google applications as learning tools in three university courses. The results revealed students’ experiences and perceptions in using Google applications for academic and social purposes, providing valuable information in designing the prototype of the new to the University of Nicosia “UNICloud” — a blended learning environment aiming to meet student expectations and support evolving pedagogical approaches.

Introduction
The process of designing learning environments is of major importance in an era where technologies rapidly evolve, students’ needs in knowledge and skills development change, and new teaching and learning strategies are revealed. One response to this is to deliver the advanced technology students need by using the ever-evolving Web 2.0 services and social networking that enable students, faculty, and administrators to collaborate and achieve a high quality of learning. Projects and services of the Web 2.0 family are an important part of our daily life activities, with social networking services regularly enrolling millions of people, enabling communication, collaboration, participation, and sharing. What about enabling education too? Related recent studies revealed evidence that students can benefit in a variety of ways from the availability of a private, ‘university only’, social networking system (Anderson, 2007; Bonwell & Eison, 1991). With the ongoing advances of technology, academic institutions that hope to successfully empower their infrastructures and technology assets will be employing a web-based blended learning environment design.

Given the above, the current paper integrates Google applications as learning tools to achieve specific educational objectives within three university courses. The paper examines students’ experiences and perceptions regarding Google applications within an educational setting. Specifically, the study examines the amount and quality of interaction with classmates and lecturer; the quality and quantity of learning experiences in a
student-centered environment, and the relation of the online tools to their course. This paper is the first phase of an ongoing project entitled “UNICloud.”

**Literature Review**

**Web 2.0 Technologies in Education**

Technological advancement in information technology and telecommunications resulted in the development of the Web 2.0 where users are Contributing, Collaborating, Creating — the 3Cs (Ala-Mutka, Punie, & Ferrari, 2009; Hargadon, 2009; Richardson, 2009). Web 2.0 sets the foundation of a new era of information searching and processing. Web 2.0 could be characterized as a revolution in the way the Web is being used. For many people Web 2.0 is deeply associated with web-based services and applications such as blogs, wikis, multimedia sharing services, content syndication, podcasting, and content tagging services which facilitate a more socially connected Web where everyone is able to add to and edit the information space (Anderson, 2007). These web-based services and applications reveal the foundation of the Web 2.0 concept and are already being widely used in educational contexts. Actually, these services operate using the building blocks of the technologies and open standards that support the Internet. Most of these applications have been in use for a number of years now with some integration of new features.

Millions of people use various social networks such as Facebook, MySpace, Twitter, Delicious, Flickr, LinkedIn, and Live Journal. Additionally, numerous people around the world employ various Web 2.0 tools such as discussion forums, blogs, wikis, chat rooms, electronic calendars, and electronic documents (i.e., Google documents). Having in mind the opportunities provided through Web 2.0, and the changes in users’ roles, social networking can be applied in educational networking. Web 2.0 tools can be used for teaching and learning purposes towards achieving educational objectives. Various researchers argue that the new web will dramatically change education in the 21st century (Ala-Mutka et al., 2009; Hargadon, 2009; Richardson, 2009). It will alter the way students approach learning, the way teachers approach teaching and learning, and finally the way students and teachers interact and communicate and the way they learn from each other.

Several companies are working on ways to extend existing services with some of them providing services to the educational sector. Google is one of these companies and offers Google Apps services providing independently customizable versions of several Google products under a custom domain name.

**Google Applications in Education**

The idea of the classroom being the only setting in which students can learn and interact with faculty is becoming outdated as the development of out-of-the-classroom tools continues to skyrocket (Motschnig & Holzinger, 2002). Google applications for education offer constant enterprise innovation saving a university’s time, money and the hassles of managing these IT solutions. For example, Oregon was the first state to get Google Apps, and managed to save about $1.5 million for e-mail, as well as to reduce the
budget for hardware and software upgrades since the Operating System is in the browser (Wolf, 2010).

The web-based application currently provides a set of customizable tools. Through these Google tools communication and collaboration among faculty, staff, and students within the teaching and learning process are enhanced. Additionally, individualized teaching and learning that addresses the needs of various students is easily achieved. These tools can be categorized in three groups: 1) Communication (hosted e-mail, shared calendars and integrated video chat); 2) Collaboration as students and teachers can share documents online at any time and location via Google Docs and Google sites; and 3) Customization as IT systems can be easily integrated with Google (Google Apps, 2010).

**Student-Centered Learning**

Student-Centered Learning (SCL) has been defined in many ways — the core, however, can be found in Cannon’s work: “Student-centered learning describes ways of thinking about learning and teaching that emphasize student responsibility for such activities as planning learning, interacting with teachers and other students, researching, and assessing learning” (Cannon, 2000).

SCL shifts the focus of the responsibility of learning to the students, helping them to develop characteristics of lifetime learners such as incentive, self-evaluation, time management, and the skills to gather data and make informed decisions.

During the last few decades the literature on education has presented a broad variety of SCL methods and evidence that proper implementation of SCL could lead to increased motivation towards learning, with more positive attitudes toward the subject, greater retention of knowledge, and deeper understanding (Bowell & Eison 1991; Johnson, Johnson, & Smith, 1991; McKeachie, 1986; Meyers & Jones, 1993).

Student-learning research emphasizes the importance of concentrating on students’ actions and their reasons for doing so, rather than on what the lecturer does (Biggs, 1990; Biggs, 1999; Shuell, 1986). The role of the lecturer in SCL concentrates on being a facilitator, group-work observer, and resource provider with students having full responsibility for their own learning. In our experience/work, we have found group work learning is a valuable resource and an important part of an efficient teaching and learning process (Ktoridou & Dionysiou, 2011). A productive SCL group-work approach can be determined by how well students work together to share their individual findings and achieve a common goal. However, in cases where the students are not capable of working effectively in a group, sharing their findings, and reaching a common conclusion the lecturer’s role becomes extremely important, since he/she is responsible for facilitating the students’ collaboration process. Overall, while students are responsible for their learning in a SCL-designed environment the lecturer as the facilitator has significant responsibility towards the overall implementation and success of the teaching and learning process — that is, the provision of learning outcomes, assessment, and evaluation that support the students’ self-centered learning.
SCL strategies are quite demanding shifting the focus of learning and responsibility onto the student. However, the responsibility of the lecturer to promote and sustain students’ independent learning process is even greater. By encouraging students to get actively involved in their own learning and by focusing on the quality of learning outcomes lecturers are more likely to encourage cognitively deeper and richer learning experiences for their students (Newble & Cannon, 1995). SCL methods include active learning (the responsibility of learning is on the learners); competitive learning (learning motivated by competition); and inductive teaching and learning (developing general principles through using observations). Inductive teaching and learning is an outstanding example of student-centered learning in higher education. Finally, SCL methods place emphasis on learning instead of teaching.

Combining the Web and Student-Centered Learning
Online educational tools are particularly well suited to be used with the SCL. They provide students with the freedom to search, explore, take initiatives, and become developers of learning material, having in mind the educational goals they set for themselves. The Web can be used to develop an e-learning platform, where student-centered learning is employed and the advanced technology needed is provided for faculty and students to collaborate and communicate in a totally different dimension, providing numerous learning opportunities and challenges. Such an environment enables teams of students to effectively work on a project, while becoming ‘masters’ of their learning, set educational objectives for themselves, and gather information they consider useful and necessary (Motschnig & Holzinger, 2002).

Academics and practitioners are continuously seeking ways to enhance and enrich their classes as well as to motivate their students. Higher education institutions should focus on designing student-centered learning environments integrating Web 2.0 technology as tools within the teaching and learning process. Along the same lines, it is important to examine the application of SCL within a web-based environment where students will be responsible for their own learning, get actively involved, and participate in the learning process. In such an environment (SCL within a web-based environment) the lecturer plays the role of the facilitator and information supplier, and students gain self-appreciation during learning (Brandes & Ginnis, 1986).

Methodology
A case study approach was employed for the purposes of this study, collecting qualitative and quantitative data (Creswell, 1996). The methodology was divided into two phases: Phase I where students’ interactions and experiences regarding Google applications environment were examined and Phase II where the data gathered from Phase I and, specifically, students’ ideas and opinions provided essential evidence in developing the “UNICloud” — a blended web-based environment aiming to meet lecturers’ and students’ expectations and to support evolving pedagogical approaches.
Phase I: First of all, Google Apps were integrated in three undergraduate courses during Fall 2010 and specifically for 12 weeks: MGT-370 (Management of Innovation Technology), MIS-151 (Business Software Applications) and COMP-150 (Microcomputer Applications). User accounts and e-mails were available for all 100 students enrolled in the three courses. Lecture presentations, notes, and case studies were initially uploaded on Google cloud and shared with students individually or in teams. To improve student-to-student and student-to-lecturer communication and collaboration the following tools were set up: the Google-talk tool for instant messaging, calling (VoIP), voicemail, and file transfer. Additionally, the University domain was set up according to the Google Apps Education Edition and students’ and lecturers’ accounts were integrated and provisioned. A 3-hour training session on managing the following Google applications was provided to the students: mail, calendar, docs, talk and sites. The goal was to train the students on how to use this set of customizable tools to communicate and collaborate effectively with peers and lecturers and perform the course activities and exercises. After the training session all teaching material (lecture presentations, case studies, summary questions, problems, additional articles, white papers, research papers) were uploaded to the lecturer’s account in Google Apps Documents. For all three courses, the lecturer shared the next day’s lecture, the relevant real life case, and/or the discussion questions/complex conceptual problems with the class. Students were assigned to perform various exercises and activities either individually or in groups depending on the topic and nature of the exercise/activity. The students were also asked to report their findings in class using technology. When students worked in groups, they were required to use Google Talk to communicate, collaborate, and share their work.

Phase II: The data collection process took place through ongoing classroom and web-based learning environment observations and focus groups.

Classroom and Web-based Observations
Web-based and classroom observations examined the amount and quality of interaction with classmates and lecturers and the use of the online environment for educational and social purposes. This was achieved through quantification, involving counting the frequency and duration of logging into the system, and the frequency and duration of online talks, with peers and lecturer. More specifically, the lecturer monitored students’ online activities that included student-to-student and student-to-lecturer communication, collaboration, and sharing. Through classroom observations the lecturer monitored group and/or individual presentations/discussions as well as face-to-face communication collaboration and sharing.

Focus Groups
Three focus groups (one focus group for each course) took place as soon as the courses ended in December 2010. The participants for each focus group were chosen based on a number of criteria: age, gender, specialization, and educational background. Overall, 30 students participated in the focus groups (10 students in each focus group). On average, the duration of each focus group was 1–1.5 hours. During the focus groups mainly open-ended questions were asked in an attempt to provide students with the opportunity to express themselves freely and openly on the subject under investigation. The focus
groups were conducted in order to get insights and to facilitate in-depth analysis of the concepts under investigation from the students’ points of view (Kvale, 1996). More specifically, the focus groups were targeted to investigate and explore students’ views, experiences, and perceptions regarding Google Apps utilization and outcomes as well as their interest in the development of a university Cloud Environment. Additionally, through focus groups the following were investigated: learning experiences in a student-centered environment, how Google tools and features were used by the students, and what other tools the students would like to have in a blended learning environment.

**Analysis**

The qualitative data collected from the observations and the focus groups was analyzed with the method of continuous comparison of data (Maykut & Morehouse, 1994). Classroom observations and focus groups aimed to evaluate the quality and quantity of the online learning experiences in a student-centered environment and the interaction among classmates and lecturers, students’ motivation, and finally how the web-based environment was used for educational and social purposes. Analysis through observations and focus group sessions were integrated in an attempt to explain the role of student-to-student and student-to-lecturer online communication and collaboration as well as their learning experiences through a blended environment, i.e., a combination of cloud and in-classroom environment.

**Data Analysis**

Data analysis describes how students used Google applications to create academic and social identities. Specifically, besides using Google apps in the context of learning students were allowed to create their own profiles, upload photographs and documents, create and join discussion groups, send messages, and publish in blogs. Based on the sample of the study, the analysis of the results for Phase I focused on students’ interactions and experiences regarding the Google applications environment (See Table 1). More specifically, students’ usage of G-mail, G-talk, and G-Groups frequency and duration were counted in order to examine the interaction patterns.

**Table 1: Course Online Interactivity**

<table>
<thead>
<tr>
<th>Variables measured</th>
<th>Total (12 weeks – 84 days)</th>
<th>Per Student (hrs/student for 12 weeks)</th>
<th>Per Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Times Logged (students)</td>
<td>590</td>
<td>59</td>
<td>7</td>
</tr>
<tr>
<td>Logged in Duration (hrs)</td>
<td>9450 hrs</td>
<td>94.5</td>
<td>1.12 hrs</td>
</tr>
<tr>
<td>G-Groups Participation (per group)</td>
<td>30</td>
<td>0.3</td>
<td>0.00357</td>
</tr>
<tr>
<td>G-mail Messages</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student-to-Lecturer</td>
<td>187</td>
<td>18.7</td>
<td>0.22</td>
</tr>
<tr>
<td>Student-to-Student</td>
<td>230</td>
<td>23</td>
<td>0.27</td>
</tr>
<tr>
<td>G-Talk Messages</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student-to-Lecturer</td>
<td>78</td>
<td>7.8</td>
<td>0.09</td>
</tr>
<tr>
<td>Student-to-Student</td>
<td>356</td>
<td>35.6</td>
<td>0.42</td>
</tr>
</tbody>
</table>
In order to better interpret the table above it is important to mention that for G-mail messages and G-talk messages, the entire exchange (e-mails and talks) between two or more people was counted as one exchange.

**Frequency of students’ online activity:** According to Table 1 students logged into the system 59 times each throughout the entire semester, that is 84 days. Additionally, each student spent 1.12 hours per day using Google tools. Participating in a Group seemed not too interesting for the students since each student participated 0.3 times in group exchanges throughout the 12-week courses. Each student was involved in 23 e-mail exchanges and in 35.6 G-talks with their peers. The students had fewer interactions with their lecturers than with their peers since each student was involved in 18.7 e-mail exchanges and in 7.8 G-talks with their lecturers. It seems that students preferred to communicate and/or collaborate with their classmates through G–talks rather than exchanging e-mails. This is an important indication of frequent use of the Google tools by the students.

**Quality of students’ online activity:** Students found this environment convenient not only for learning purposes but also for personal collaboration and communication. They characterized the environment as user friendly and educative. One of the students commented on the easy access and flexibility of the Google environment: “I am flexible to study anyplace anytime anywhere.”

**Online learning experiences through the web-based platform:** The online Google Docs (word processing, spreadsheets, presentation applications) allowed students to work on the same document at the same time from anywhere at their own pace and at the same time have an online real time communication. Collaborating in projects proved to be an excellent educational experience for the students in exchanging and sharing ideas, improving their writing skills, and at the same time learning how to effectively collaborate with others.

**Recommended features and tools for the web-based platform:** Valuable recommendations were made by students for the design of the new Web-based environment. The tools students suggested to be included in “their” new learning environment were online Chat, links to Facebook and Twitter, wikis, translators, dictionaries, maps, weather forecasts, and online games.

The data gathered from the three focus groups revealed that Google Apps was a motivation for students to get even more involved in the teaching and learning process since they had the advanced technology tools they needed. Students explained that they found this way of learning attractive, challenging, beneficial and convenient since they experienced ubiquitous communication, and that is why they spent so much time online. A student commented on the nature of the course: “This course is challenging and forced us to learn, explore, discover, analyze, present individually and/or in groups...” It is important to note that the majority of the students in all three courses found the 7GB of free storage offered by Google Apps was extremely convenient for them. One student said it was “...just excellent to have ubiquitous access to my work.” They uploaded and
organized their material for all their courses online, reporting that they used the 7GB of online storage for their other courses as well. Some other students reported that they felt free from USBs: “7GB of online storage was everything needed, no more USBs.”

Students expressed satisfaction in using the communication tools G-mail, G-Talk, and G-Groups not only in sharing and collaborating with classmates but felt comfortable and confident in discussing their problems, ideas, and concerns with the lecturer. For example, one student commented that “It was more convenient to communicate and share with classmates’ project issues.” The online learning environment was revealed to be a bridge of communication between the lecturer and the student. Students felt there was easy access to their lecturers and they felt more comfortable in getting in touch with them: “I felt more comfortable and confident in collaborating with my lecturer,” and “I felt very comfortable to contact my lecturer and share a personal problem that negatively influenced my university performance.” Learning experiences proved to be beneficial for students. Such an environment exposed students to responsibility for their learning: “It was the first time that I felt I had a choice for my learning,” and “I felt more responsible for my learning.”

Students’ comments revealed that having to work in groups, they learned to share, exchange, argue, and respect the members of their group in order to come to a common solution on a given problem. Specifically, a student mentioned that “Group work helped me to learn to share and exchange my views and come up with solutions everybody agreed upon.”

Some students (18%), however, expressed concerns on having to work alone without the presence of the lecturer, expressing their preference to be in a classroom environment with their classmates and lecturer. One student commented, for example, that “it is too complicated for me to work in such online environment; I do not feel that I know that much in order to work by myself. . .and have a high degree of responsibility over my learning.” Other students focused on equipment and time as two reasons for not liking to work in such an environment: “Working online is not convenient for me since I do not have a computer at home and I need to spend too much time at the labs...or borrow my friends’ laptops,” and “I spend more time to finish an assignment online than using the traditional way.”

The collaborative nature of Google Apps for Education appeared to be a perfect fit for the lecturers’ institution, allowing students to work remotely on collaborative assignments. Additionally, a student-centered approach employed in a blended learning environment can lead to students’ increased confidence in and motivation towards learning. Based on the above, it is evident that all three categories of Google tools (Google Apps, 2010) should be integrated within “UNICloud”: 1) communication tools such as hosted e-mail, shared calendars and integrated video chat in order to enhance discussions; 2) collaboration tools in order to promote remote document sharing among students and lecturers at any time and from any location and real-time collaboration; and 3) customization tools in order to make sure that students’ needs and demands are addressed, and a safe and secure environment for the university community is provided.
Finally, the outcomes of this research work provided evidence for the researchers to develop the prototype of a new blended learning environment “UNICloud” for the university. The system has a simple and intuitive user interface where even students with limited IT skills can easily log in, navigate and work with others. The following set of customizable tools was integrated in the prototype: online Chat, links to Facebook and Twitter, wikis, translators, dictionaries, maps, weather forecasts, and online games. The majority of them were recommended by students. Having at their disposal these customizable tools, faculty, staff, and students will be able to collaborate effectively through a new learning environment, meet their learning goals and overcome and communication barriers that might exist in a traditional classroom environment.

Conclusion

The results provided evidence to the researchers to infuse student ideas, integrating their energy and talent into the prototype design process of the new to the university “UNICloud“ — a blended learning environment aiming to meet student expectations and support evolving pedagogical approaches. This system will enable students, faculty and administrators to communicate, collaborate and share in a secure cloud environment.

This educational experience proved to be beneficial for students in sharing ideas, raising diverse learning issues and, most importantly, successfully collaborating with their peers and lecturers in a different environment. Uniquely equipped Google Apps provided more resources for the lecturer to monitor students’ online communication, provided feedback to shared lecture presentations as well as students’ queries through Google mail messages. Quality learning experiences for lecturers and students can be provided through a blended learning environment when a student-centered approach is employed. Online communication and collaboration, where knowledge, thoughts, and ideas are shared was a vital part of the course. Finally, further research will be conducted where the recently developed “UNICloud” prototype system will be tested and evaluated based on various parameters (i.e., technical and educational issues, students’ and lecturers’ opinions based on ease of use, and usefulness of use).

References


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