GAMING ON-LINE: A SIMULATION APPLICATION

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ABSTRACT

This study develops a theory about the process through which communities form in computer-mediated classes. The study was designed as series of interviews with both students and educators. In addition, we conducted a comprehensive survey to capture the culture surrounding distance learning. Our findings indicate that the distance learning experience is achieved by accomplishing the following: (1) making friends on-line with whom students feel comfortable communicating; (2) forming a confortable distance learning community where students feel that they are part of long, thoughtful, threaded discussions on a certain subject; (3) creating camaraderie. We note that this last guideline is usually achieved after long-term or intense association with others involving personal communication. We also show that each of these guidelines involves a greater degree of engagement in both the class and the dialogue.

INTRODUCTION

Teaching with computer-mediated devices is becoming a very popular approach to teaching. Many researchers report of distance learning being employed in universities by providing students the opportunity to enjoy the benefits of technology and take their classes in a different format (e.g., Chang and Cho, 2009; Wu and Fang, 2009; Durget and Smith, 2009; Chong and Kasemanandan, 2010).

One of the main "clients" of DL initiatives is business schools. Business schools concentrate on teaching students business related subjects, such as management, accounting, finance, marketing, etc. (Smith, 2010; Sun and Chen, 2010). When considering all the business disciplines together, one of the capstone courses in a business school is the business game course. Business games and simulations have been developed since the 1950s; however, their complexity deterred instructors from frequently using them in the classroom. Today, with a more mature internet network, educators are more willing to teach the game on the web, using DL tools. Moreover, several game companies, that develop business games, have been distributing their games on the internet and started administering those games for education institutions. Indeed, this facilitates the endorsement of games as a teaching tool in education (e.g., Burns, 1998; Griffin, et. al., 1999; Geller and Smith, 2009; Chang, 2010).

This study examines the application of such a game in a DL environment. We specifically interested in examining the ethical issues related to the learning experience. Our focus is ethical issues related to distance learning in general and to the simulation game in particular. We also examine how those ethical concerns relate to the DL experience. Organized in six sections, the next section explores the literature on DL education, ethics and business games. Then we present a learning model we will follow in this paper. Next, we state this study's hypotheses and detail the methodology we use (the simulation). We then present our test results and investigate the hypotheses. Finally, we discuss the results, draw some conclusions and suggest recommendations for future study.

LITERATURE REVIEW

DISTANCE LEARNING

DL is an innovative method that uses technology to enhance learning. It is usually being used remotely where the learner and the instructor are not present at the same place (Verduin & Clark, 1991; Grisham and Smith, 2009). Many studies tried to examine the effects of DL. Those effects take place in universities; naturally, they impact the students who take the course or courses using DL; DL also impact the instruction method, as the students are not present in a classroom, the instruction method must be modified. The reader is referred to several review papers that were published in this area. For example, see Schlosser and Anderson (1994), Moore and Thompson (1997) and Lesh and Rampp (2000). Some studies show that students consider the DL method as superior to the traditional teaching methods and therefore, it bears several benefits for the students as it enhances the learning experience (for example, see Lei, 2009; Wu and Fang, 2009).

One important factor that makes DL so unique is that it allows learning to be an individual matter. That is, the learner learns in his or her own time, in his or her own pace, rather then following the instructor's dictated pace (Kosmahl, 1994). As stated earlier, studies that explored DL show that this method is considered better than traditional methods because of the flexibility it allows to the learners. This outcome comes at lower costs to the students (all they need to have is a computer and a headset) and the institutions using the method, as they do not need to supply the students with campus services, such as classrooms (Russell, 1999).

However, an investigation of the literature reveals that over flexibility may deter students from learning. Studies

show that students tend to postpone their assignments and sometimes, they can go through an entire course without learning and completing their assignment only toward the end. Unlike traditional teaching methods, the instructor usually cannot follow student participation in virtual classes, as those can be easily manipulated using the available technology (Webster & Hackley, 1997). Griffin et al. (1999) states that sometimes one may even find negative reaction to this method. This usually happens when the students are not technology savvy and have hard time operating in a virtual class.

PEDAGOGY

In today's environment it is only natural that we desire to see our students becoming more ethical. Many argue that higher education institutions should increase their emphasis on ethics (e.g., Bennis and O'Toole, 2005). However, usually educators fail to help students thoughtfully assess what goals are worthy of professional (and personal) aspirations, and aid and abet physical, psychological, spiritual pain for our students, the organizations they work for, and the society at large (Giacalone, 2004). Koehn (2005) agrees that we are failing as professionals. He argues that what is needed is a radical change in peoples' self conceptions and that it is our duty as teachers to bring about a positive change in our students.

The argument to increase pedagogical emphasis on Business Ethics is supported by Kohlberg (1984) who suggests that young adults are more open to learning and better deal with ethical issues. In further support of the idea are studies showing that ethical attitudes change with academic exposure or training (e.g., Acevedo, 2001).

In addition, studies also show that some decision makers are unaware of the ethical nature of their decisions and others seem to believe that ethics should not even be applied to their decisions (Teach et al., 2005). This means that business decision makers are either unaware or unwilling to believe that that business decisions have ethical consequences, that ethical issues should not be considered in their decisions, and college students as future decision makers are open to and capable of learning to incorporate ethics into their decision making . So it is fairly easy to argue that we ought to try to teach business ethics.

## BUSINESS SIMULATION GAMES AND THE LEARNING EXPERIENCE

A business simulation game offers students the opportunity to learn by doing in as authentic a management situation as possible, to engage them in a simulated experience of the real world and to produce experiential learning experiences (e.g., Garris et al., 2002; Kolodner, 2003; Martin, 2000; Lei, 2009; Chen and Lin, 2009). Business games and simulations related to the Information Systems field have been studied both in academia and industry (e.g., Asakawa and Gilbert, 2003; Ben-Zvi, 2010; Chen and Pang, 2010; Dasgupta, 2003; Dickinson et al., 2004; Michaelson et al., 2001; Po and Cohen, 2010). Erkut (2000) and Po and Deng (2010) state that games provide several advantages when used in a DL context.

Business games and simulations also present an experiential learning experience. Although published more than 20 years ago, Kolb's theory (1984) on experiential learning is still considered a central theory in education. His model emphasizes the interaction between experience and learning by exploiting the subjective nature of the learning process and creating a transformation of experience that engenders knowledge (Mainemelis et al., 2002). Business games relate to experiential learning as they present a method that epitomizes experiential learning (Garris et al., 2002). They provide students the opportunity to become intimately involved in decisions faced by executives in real organizations, to test the understanding of theory, to connect theory with application, and to develop theoretical insights.

Kolb's model consists of four elements: concrete experience, observation and reflection, the formation of abstract concepts and testing in new situations. The model is represented as a learning circle, depicted in Figure 1.

The concrete experience refers to introductory concepts and skills acquired when performing specific (learning) tasks. Observation and reflection represents a synthesis of the concrete experience and movement towards an understanding of principles and theories associated with a given discipline. Forming abstract concepts involves one's grasp of how to study something. This may include application of subject-specific techniques and methods or informed judgments for determining when to

Figure 1.
Kolb's (1984) Learning Model

| Concrete Expereince | → | Observation and Reflection | → | Forming Abstract Concepts | → | Testing in New Situation |
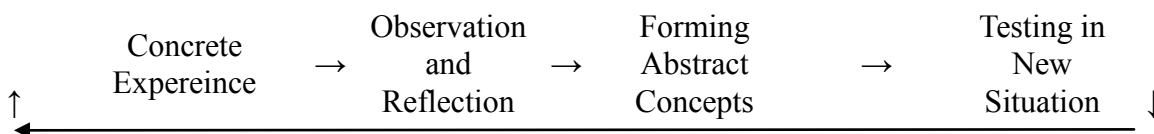
use appropriate procedures. Testing in a new situation refers to applying the acquired concepts and experiences in another setting. Although it seems as the highest level of learning, it actually lays the foundations for new learning experiences.

Kolb and Fry (1985) argue that the learning cycle can begin at any one of the four points. However, they suggest that the learning process should begin with a person carrying out a particular action and then seeing the effect of the action in a situation. Generalizing may involve actions over a range of circumstances to gain experience beyond the particular instance and suggest the general principle. Understanding the general principle is the ability to see a connection between the actions and effects over a range of circumstances.

This model represents a practical heuristic for exploring the interplay between teaching, learning, and ethical matters. Thus, we discuss ethics issues in a specific game course.

HYPOTHESES

The DL environment forces the students experience a "real world" case scenario that is indirectly chosen or directed by the instructor. The benefits of this indirect approach according to Marturano (2005) include the development of moral imagination, critical thinking skills, and helping the student feel immersed in a real ethical dilemma, creating empathy with the protagonist's problem. Thus, the first hypothesis deals with the students' experience of moral dilemmas:

Hypothesis 1: Students playing the business game via DL will experience more moral dilemmas.

In addition to moral dilemmas, when making ethical decisions, one should pay attention to his or her own conscience and understand that the solutions to ethical problems are usually not easily definable. It has been found that students often realize that concept when engaged in indirectly ethical situations, such as simulations (Sondergaard and Lemmergaard, 2002). Accordingly the next two hypotheses are:

Hypothesis 2: Students playing the business game via DL will be more aware of one's conscience when making ethical decision.

Hypothesis 3: Students playing the business game via DL will express their understanding that ethical problems are usually not easily definable.

METHODOLOGY

We used a business game developed in the United States, commonly known as the International Operations Simulation Mark/2000 (i.e., INTOPIA). This game is designed to yield substantial payoffs in management training. It forces participants into a stream of entrepreneurial top management decisions, where they search for logic and synergy in the business objectives-strategy-implementation sequence (Thorelli et al., 1995). The task of the playing teams is to make decisions which will guide operations in the current period and which will affect operations in subsequent periods.

The study was conducted in a large US college. The participants were MBA students. We used students from two classes: one was our regular face-to-face business game class and the other was a DL business game class. Overall we had over 200 students. Although the face-to-face class was larger than the DL class, the difference in the number of students was insignificant. The study was conducted back in the fall semester of 2005 and the spring semester of 2006. The DL class had 45 students in the fall semester of 2005, whereas we had 41 students in the spring semester of 2006. The face-to-face class had 64 students in fall 2005 and 56 students in spring 2006. In each semester we divided the students into different groups, each representing a company of four or five participants assuming executive roles. To make the teams more diverse, we formed the teams in advance according to the students' concentrations. We believe that this intervention actually enhance the practicality of the game, as companies consist of executives from different backgrounds. When conducting a demographic investigation, we revealed that both groups (the face-to-face group and the DL group) had more or less the same characteristics.

In the beginning of each semester the students got an orientation lecture. The face-to-face students got the orientation session in class; they were able to ask questions, communicate and interact with the instructor. The DL students also received the orientation session. However, their session was pre-recorded and they were able to listen to the recording at their own time. This may become an advantage as you may prepare to class at your own time; However, this prevented the students from asking the instructor direct questions, related to the orientation. The use of email and virtual communication with the instructor eased the learning experience with the DL students. We believe that the face-to-face orientation helped also students who did not interact with the instructor, as they were able to listen to the communication in class. This was not possible with the DL group.

In each of the two semesters, the two groups, the face-to-face class and the DL class, were administered separately: the traditional-taught students were attending classes and were playing the game in class, on campus. They also received assistance from the instructor whenever they attended their classes. The DL class on the other hand, did not received this immediate assistance and had to come up with questions to the instructor and send them through email. Only them were they provided with the desired assistance.

By the end of each semester, after the game was over, the students were asked to complete a short questionnaire evaluating their moral dilemmas and their ethical behavior during the game. This questionnaire subjectively measures

the students' responses and associates that with the game itself. The questionnaire was based on a seven-point Likert-scale (see the appendix for the text of the questionnaire).

TEST RESULTS

The hypotheses we stated for this study consider ethical issues. Although the students experienced moral dilemmas, the DL group did not show a higher level of dilemmas. Therefore, we reject hypothesis 1. However, on average, the students came to realize that when making ethical decisions one should pay attention to his or her conscience. Also, they understood that solutions to ethical problems are usually not easily definable. Therefore, both hypotheses 2 and 3 were confirmed. The results from both groups along with the statistical tests are presented in Table 1.

In addition to taking the course and playing the game, the students also had to deal with the additional technical burden placed on them. This was especially noticed for the DL players. They had to interface via the internet, and this affected their game behavior. Also, their communication with the game administrator was conducted through email, and that is completely different then interacting with an instructor face-to-face.

Based on the information presented in Table 1, it can be concluded that the difficulties placed on the DL population deviated some of the players from playing the game to dealing with internet-use problems. Rather than pure learning, the DL group had to deal with redundant communication with the instructor to try and solve the technical problems. This different is significant between the two groups.

DISCUSSION AND CONCLUSIONS

Many studied have examined the implications of a DL environment. Our findings reveal that students did not consider this type of method to be superior to the face-to-face teaching method. Moreover, students in the DL group that we examined reported on several communication problems and technical difficulties in using the software. Our investigation reveals that those problems mainly relate to internet operating skills that the students need to develop, as this was not part of the instruction. We emphasize that although computer skills are important, classes should not highlight how to apply a certain teaching method but they should concentrate on the content itself, that is, the subject matter.

Our investigation also revealed that although the DL instructor tried to adopt a 24 hour policy, that is a 24 hour availability and responding to emails within a day, this was not always the case. In some instances, the students experienced delays of several hours, and in one case the problems were so severe that the system was shut down for two days. Although when examining the entire time table of the semester, spanning over three months those delays do not seem significant. However, when dealing with DL, open and swift communication is important, as the system is the only way the students can get feedback on their work. Without this feedback the students may find themselves lost without guidance.

Overall, we cannot state that DL presented a worst experience than the traditional teaching method of attending classes on campus. However, the experience was different and therefore requires extensive training of potential DL instructors and a lot of preparation, including orientation sessions for the students, to teach them how to operate

Table 1.
Means and Standard Deviations (S.D.), Z values and p-values of Responses
for the DL and Traditional-Taught Groups.

Variable	DL Group	Traditional-Taught Group	Z	p-value		
	Mean	S.D.	Mean	S.D.		
Moral Dilemmas	4.53	0.64	4.61	0.67	0.81	0.3843
Awareness of one's conscience	5.08	0.59	5.01	0.51	0.89	0.3713
Ethical problems are not easily definable	5.93	0.52	5.86	0.46	1.01	0.3106
Experiencing problems	5.96	0.62	4.89	0.48	5.29	<0.0001

the system and the software, in order to achieve a productive learning environment. One of the single benefits of the DL experience was related to the ethical experience. This result indicates that the students obtained an increased consciousness of what it means to be in an environment where decision making involves moral issues. Moreover, we have showed that it is indeed possible to create a structured self-awareness model that is capable of presenting the difficulties of ethical decision-making in a DL environment. This study suggests that such a learning model is possible and that is has some effect on the participants beyond the traditional benefits of DL situations.

When examining the overall reaction of students to the DL environment, compared to the traditional teaching method, it seems that students enjoy the experience very much, but we cannot declare any method to be superior, as the difference are not statistically significant. In Table 2 we summarize the players' reactions to the experience across the two groups. Those results were obtained using common course evaluation forms.

We also discovered that in the traditionally-taught group the use of the game produced relatively weaker relationships between interaction during the game and course-related content. On the other hand, in the DL group it appears the game was an important factor, and the difficulties the students experienced had a major impact on the rating of this method. We note that this study did not explore the computer fluency skills the students possessed. As we revealed that those skills play a major role in the DL environment, we suggest this topic to be further investigated in future studies.

This leads us to highlight the role the institution has in helping creating DL environments. As universities aim to create the optimal learning environments the cost savings in classes and other administrative issues should be invested in technology and software to facilitate the use of DL. We recognize how different approaches to teaching the same material may bring about different learning results. In addition, we realize that most of the students faced pressure from others to do wrong in the game (as they themselves expressed that). Although many eventually succumbed to that pressure, they became aware of their conscience when making ethical decision and developed an understanding that those ethical problems are usually not easily definable. Perhaps we, as educators, need to develop teaching methods that will help our students not yield to that kind of pressure. We suggest an extensive study of this topic, as well as other learning effects produced by games and simulations. Research into the advantages and disadvantages of this type of learning is clearly warranted for 21st century education.

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Table 2.
Means and Standard Deviations (S.D.) of Responses for the DL and Traditional-Taught Groups.

	DL Group		Traditional-Taught Groups	
	Mean	S.D.	Mean	S.D.
Course Evaluation	5.12	0.45	5.20	0.41
Simulation Evaluation	4.67	0.79	4.85	0.55

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APPENDIX

Course evaluation. Please indicate your answers:

		Disagree			Neutral			Agree
1.	The course method promoted knowledge of terminology.	1	2	3	4	5	6	7
2.	The course method promoted understanding of principles and generalizations.	1	2	3	4	5	6	7
3.	The course method promoted application of subject-specific skills, techniques and methods.	1	2	3	4	5	6	7
4.	The course method promoted application of acquired knowledge in different scenarios.	1	2	3	4	5	6	7
5.	Playing the game, I experienced several moral dilemmas.	1	2	3	4	5	6	7
6.	When making ethical decisions one should pay attention to one's conscience.	1	2	3	4	5	6	7
7.	Solutions to ethical problems are usually not easily definable.	1	2	3	4	5	6	7