

# Academic Synchronous eLearning vs. Traditional Frontal Teaching – Students’ Achievements and Attitudes

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**Abstract**— During two academic years, “Business Simulation Game” course students’ achievements and attitudes were compared. The “Business Simulation Game” course is conducted at both our School of Business and School of Economics, using one of two different methods: a frontal traditional method or synchronous eLearning method. This interdisciplinary course is mandatory for all undergraduate students during their last year of studies. Integrative approaches used in this course enable students to gain managerial skills and to develop a broad-minded approach to the diverse operations, associated with running a business corporation: accounting, marketing, finance, human resources management, manufacturing, resource planning, international business and more. Decision-making processes and teamwork are inherent, by simulating a management team of a commercial firm. The course requires intensive communications among the students, thus making the eLearning students, a priori, less likely to excel. The research,

comparing the achievements and attitudes of the students in the two different teaching methods, over two academic years, shows that the use of eLearning method did not result in any differences in performance, grades or cooperation. However, satisfaction levels with both the quality of the class meetings’ tutoring as well as with the learning materials, was significantly higher among the eLearning students, thus strengthening the case for using eLearning in this type of course.

**Keywords**— Business Simulation Game, eLearning, Management Game, Synchronous eLearning

## I. INTRODUCTION

eLearning systems, in various forms, have been in use for quite some time now. In its modern form, it started with "open universities", where teaching materials were sent to the students along with instructions regarding assignments that were required to be completed by a certain date and then mailed back to the teacher. The inherent sluggishness of mail systems made it quite cumbersome, but it still provided a solution

when no physical access to the campus was possible. With the advent of modern telecommunications that enables fast, safe and reliable transfer of computer files between users who were quite remote physically from each other, eLearning took on a new form: instead of sending the materials and the assignments by regular mail, email was used. However, students and teachers were not required to be connected to the computerized system at the same time. The rapid acceptance of the Internet and its capacity to enable many users, from all over the world, to be connected simultaneously to the same computers, spurred the development of synchronous eLearning systems which enable almost "live" lessons to be given through the intermediation of dedicated software systems. These systems have been used for teaching a variety of courses, but in most cases the courses chosen to be taught this way were those that were predominantly based on frontal lectures and the students' interaction – both with the teacher and among themselves – was minimal. The question that this work tries to answer is whether synchronous eLearning can have good results in courses requiring intensive interactions between the students and the teaching staff and also among the students themselves. We do this by offering the same identical course – requiring such interactions as an integral part - using both the formal teaching method and the eLearning method, and comparing the results obtained by the two groups. It is shown that there are no differences in the measurable achievements and satisfaction between these two groups, and thus synchronous eLearning may be successfully used for this type of courses in addition to the courses already offered using it.

## II. BACKGROUND

### A. *eLearning*

eLearning is a fairly well-known term these days, even if its inner mechanisms or

precise scope are not. eLearning is man's most recent attempt to resolve the age-old problems created by the basic need of teacher and pupil to be in some predefined location together at a specified time. The problem is particularly acute when students wish to study with a specific teacher. In ancient times, people travelled to the location of the teacher, sometimes even relocating to that locale. Later, when writing and reading became more commonplace, a new form of learning became possible, whereby the teacher would commit to paper his thoughts which the pupil could read at a later time. This was, in effect, the birth of "distance learning", obviating the need for the simultaneous location of teacher and pupil. As distance learning evolved with the advent of print so it continues to evolve with the emergence of new technologies. Radio, television and the computer -- all have shaped and are shaping distance learning.

Definition: Formally, eLearning is a distance learning methodology for delivering knowledge or imparting skills. As part of its delivery system, eLearning uses networked computers, a phrase generally taken to mean the Internet. However, eLearning can also be implemented by other computer networks, mainly intranets and extranets.

This definition implies that an eLearning system consists of teachers and students as participants together with hardware and software facilities to enable the teaching to occur. There are, however, quite a few eLearning methods with different setups, capabilities and features [1],[2],[3]. eLearning is a form of distance learning, but not all distance learning are eLearning, since methods for example exchanging books and assignments between teacher and student – the "Open Universities" modus operandi – is not computer based and thus does not qualify as an eLearning method.

Below are a number of features that characterize distance learning. Most of them may be found in other distance learning

technologies, but not all and definitely not in the combination we find in eLearning. These features include:

- The simultaneous use of various technologies for hearing, seeing and talking with individuals who are in a different location.
- Use of all forms of media: voice, image, video, data communication
- Substantial processing power, operated and controlled by the learner
- Immediate worldwide access to immense reservoirs of information
- Instantaneous feedback capabilities
- Reusability of prepared materials, as well as the repeatability of whole sessions
- Possibility of using best-of-breed teaching systems and teachers
- Capability of performing simulations and some experiments from the learner's location.
- Communication with other learners, simultaneously with the lesson but without interrupting it.

Some eLearning systems offer immediate, on-line, feedback to the learners as well as online testing and instantaneous correction and grading. Some eLearning systems offer around the clock, worldwide, access. eLearning systems recognize two distinct approaches that revolve around the issue of whether the learner and the instructor must be online at the same time [4],[1]. Those systems that require simultaneous presence of both sides of the learning experience are termed synchronous. Those that waive this requirement – and allow complete time-disassociation between instructor and learner – are referred to as asynchronous. While pure asynchronous systems are widespread, there are very few pure synchronous systems since most of these systems incorporate some

asynchronous elements into the learning experience. Current trends in eLearning now call for deploying blended systems, incorporating both synchronous and asynchronous methods in order to obtain optimal results.

### ***B. Simulation Tools and Techniques***

Following the rapid development of computer systems from the 1950s, simulation languages and software tools have been used for designing and analyzing models to describe complex systems and processes [5],[6]. The use of simulation techniques is especially relevant when mathematical models or operations research techniques are incapable of finding optimal solutions given a set of constraints. Simulation models imitate the behavior of systems and can dynamically predict the development of situations over time. A vast quantity of information is needed to construct a realistic model and the cost of developing and using such models, in comparison to other analytic methods, can be quite high, especially when there is a need to carry out sensitivity analyses. However, there are benefits in using simulation models that cannot be achieved by other methods. These include the ability to study: complex internal interactions between different system components; the effect of changes made over time; and the ability to test consequences of new situations. Simulation systems are, therefore, used to support managerial and other professional decision-making processes.

Management simulation games are widely used for training management teams and students. In these games, teams compete in a virtual marketplace or in virtual worlds that simulate real worlds [7],[8],[9]. Simulation games as a tool for practicing new management patterns offers participants the possibility of:

- Learning about complex internal interactions between various components

of an organizational system and its environmental context.

- Experiencing and gaining a deeper understanding of expected developments and changes.
- Assessing the relative importance and interdependency of various factors.
- Examining a system's reaction to new policies, standards, and institutional changes.

### III. "BUSINESS SIMULATION GAME"

"Business Management Simulation Game (Taagid)" is an interdisciplinary course at the College of Management's School of Business Administration [7]. It is a mandatory course for all undergraduate students during their last year of studies. Integrative approaches used in this course enable students to gain managerial skills and to develop a broad-minded approach to the diverse operations associated with running a business corporation: accounting, marketing, finance, human resources management, manufacturing, resource planning, international activity and more. Decision-making processes and teamwork are inherent, by simulating a management team of a commercial firm.

Technically the course proceeds by simulation software. This software integrates all student teams' decisions and produces detailed reports and performance indicators. Students use various analytical and deduction tools (some computerized) in order to make their decisions.

The simulation process algorithm is based on several business models and represents the reaction of a competitive market to different prices and the perceived value of the goods and services the competing teams offer. Each team (representing a firm) comprises a group of 3 – 5 members, who play the role of a managerial team at a firm. The industry,

regarded as the total number of teams, consists of up to twelve competing firms. The market reaction to a firm's decisions is measured by demand for its products, reflecting the appropriateness of the firm's decisions to the industry, on the one hand, and their edge over competitors, on the other. Thus, the firms' performance, like in the "real world", depends on the decisions made by the other groups, market conditions and the state of the economy.

During the first seven weekly meetings, the entire class discusses various relevant subjects, like strategic planning, financial aspects, marketing and so on. Each group meets one or more of the game's staff members every week for a consultation on the professional aspects and possible consequences of the decisions they make.

A decision set, loaded into the system every week, represents six months in the firm's life. The duration of the semester and the need to teach many of real-life business situations as well as technical points regarding usage of the software leave, in effect, only 8 game periods, equal to four years in a company's life, for the students to control.

A central control server is used for uploading decisions and downloading results. Every team receives a set of managerial reports that reflect its performance during the last period. The private management reports that are individually downloaded by each group include a summary of its decisions, operational data, financial reports (income and expense statement, balance sheet, cash flow) and market research. The research includes industry information, consumer-related data and partial data about competitors.

Calculating performance points is based on a few factors, such as profitability, matching supply (manufacturing capacity) to market demand, financial resources,

consistency between decisions and strategy, business ethics and the way each firm is evaluated by different stakeholders. In addition to the simulation process, students are required to hand in four home assignments, and to pass a midterm exam.

The course is supported by Web-based technologies that enable easy bidirectional access and smooth transactions. Among the system features are:

A Web-based platform for file transfer accompanied by a client-side interface that allows students to make decisions and then to save them anywhere, anytime. Decision files are uploaded to the control server using FTP, followed by a success/failure message.

Home assignments (weekly case analysis and essays) are uploaded as described in the preceding step. No hardcopies are used.

- Results are loaded to the control server, allowing students to download them immediately, after authorization.
- Home assignments are downloaded directly; grades and comments are added to the files. No papers required.
- All other course materials, such as presentations, manuals, assignment guidelines, messages, etc. are all accessible through the virtual course site.
- Group discussions carried out over the Internet and by email enhance communication between students, students and staff; improve cooperation among competitors; and contribute to making the course more interesting.
- Virtual communication channels enable team members who live far away from each other and don't share the same schedule to work as a team despite the distance.
- Every transaction (decisions upload, results download, login, essay upload and download, etc.) is audited, allowing the

course's staff to track IP addresses, date and time, and other data.

#### **IV. RESEARCH RATIONALE**

As at many institutions of higher education in Israel (and the world, actually), faculty members at the School of Business Administration have been debating the use of various eLearning methods, specifically the extent to which it should be used with traditional methods.

The chief subject of debate has been the question of how much eLearning is desirable. In order to answer this question appropriately, faculty members at the School felt that it was necessary to examine all the available courses and decide whether some of them were inherently unsuitable for eLearning.

The idea behind this research was to see if the decisions made by students taking the business simulation course by eLearning were qualitatively different from those of the students taking the course in the regular, frontal lecture mode. The students taking the course via eLearning were encouraged to use eLearning tools for their meetings, discussions and decision-making sessions. In other words, encounters between students would be electronic and not face-to-face or over the phone.

We hoped that getting positive results – that is, showing that the decisions and achievements of the students taking the course by eLearning would be no worse than those of the students taking the course by the regular method – would help convince many in our school and college to expand the use of eLearning to more courses, including those courses requiring intensive, frequent, multi-partner cooperation among the students.

Since the course is given to a large group of students simultaneously (in a number of classes), it was possible to divide the classes into two categories. Some classes would

continue to be taught in regular frontal lectures while the other category would consist of those students taking the course by eLearning. The classes would be given in the same manner as far as the materials, assignments, testing and grading were concerned. No special adjustments or changes in the course would be made for the eLearning class. The course would simply be given in the same manner, with the same teaching staff, during the same semester. Since the teachers in the eLearning classes would be the same teachers giving the frontal lectures (on different days and times, of course) the issue of teacher-related changes would be controlled. In addition, the large student numbers (about 600) would guarantee sufficiently large samples without any statistical compromises.

## V. METHODOLOGY

All students started and finished the course at the same time during their regular semesters and as part of their study program. This was true for the students that took the course frontally as well as for the eLearning students. With the exception of the teaching method, the assignments, tests and course structures were identical. The students knew, when they registered for the course, which method would be used in their section. Periodically, a questionnaire was given to the students; answering it was a course requirement. The purpose of the questionnaire was to reveal to the staff the reactions of the students to the content delivered during the lessons and to the instruction method. In addition to collecting that information, the students were also asked to report on their management meetings – meetings that were held in order to "manage" their company. They were asked to report the meeting's quality, organization and outcomes. All answers were kept in a database that was later analyzed.

The hypotheses of this research were:

1. There would be no difference in the student achievements between the group that took the course using the traditional method and the group that took it using the eLearning method.
2. The quality of the "management meetings" would be the same for both groups.

In order to test these hypotheses, the following questions were answered by statistical analysis of the database:

1. Were the achievements in the courses correlated with the teaching method and, if so, what is the correlation?
2. Were the achievements in the courses correlated with the methods used for the "management meetings", and, if so, what is the correlation?
3. Was one method preferable to the other as far as group results were concerned?
4. Was there a significant difference in the duration of the management meetings" between those held face-to-face and those held over the Internet? If so, which method generated the longer sessions?
5. What was the level of student satisfaction from the two type of meeting methods and did the participants find them productive?
6. In both the regular method and eLearning approach, what was the overall level of student satisfaction from the course and its instruction method?

The research was conducted over three semesters. During the first of these three semesters, about 300 students took the course. In the second semester, about 660 students took the course. The third semester had about the same number of students in the course as the first one. Overall, about 1,250 students took the course. It should be noted that since all the students were required to fill out questionnaires, no sampling was required and the statistical tests were done on the entire population.

## VI. SCHOOL OF BUSINESS FINDINGS

The main findings are given below, following each of the questions presented above. Detailed analysis of the findings appears later in the chapter.

### A. Answers to Main Research Questions

- *Were the achievements in the courses correlated with the teaching method and, if so, what was the correlation?*

There were no differences in the course achievements and grades between those students that took the frontal course and those that took it using the eLearning method.

- *Were the achievements in the courses correlated with the methods used for the management meetings, and, if they so, what was the correlation?*

No correlation existed between the management meeting method and the achievements in the course. In terms of the group results, was one method preferable to the other? At the group level, too, there were no differences in achievements and grades between those groups that took the course using the traditional method and those that took it using the eLearning method.

- *Was there a significant difference in management meeting duration between those held face-to-face and those held over the Internet? If so, which method generated the longer sessions?*

There were no differences between the two groups in the time the students from each group spent on their internal management meetings. Special attention was given to this issue, because we were interested to see if there were any learning patterns, particularly in those groups that used the eLearning method. It turned out that there were no differences between groups using the two methods throughout the semester. The same result was observed in the analysis of all the weekly questionnaires.

- In regard to the meeting methods, what was the level of student satisfaction, and did the participants find the meetings productive?

No differences were found.

- What was the overall level of student satisfactions from the course and its instruction method, in both cases?

Satisfaction from the quality of the instruction given during the classes was significantly higher among the students that took the eLearning classes. Similarly, the students that took the eLearning classes were more satisfied with the learning materials than their colleagues in the frontally taught classrooms. This was not the result of superior teaching since the same teachers gave sessions using both methods.

### B. Detailed Findings

At the beginning of the course, the students received explanations about the course process, structure and management. They were also told about how they were expected to participate. The students that took the course in the frontal format received these explanations during a normal class session. Students in the distance learning framework received the explanations during a synchronous eLearning session. As Table 1 shows, the students in the eLearning mode rated their understanding of the business simulation game higher (an average of 4.34 on a scale of 1-6) than the "regular" students (average of 3.89). The statistical tests show that the difference is significant ( $t=2.53$ ;  $df=721$ ;  $sig<0.02$ ).

**TABLE 1**  
EXPLANATIONS ABOUT THE COURSE -  
COMPARISON BETWEEN FRONTAL AND THE  
ELEARNING METHODS

	<i>Learning Method</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>
Explanations during sessions	Frontal	674	3.89	1.215
	eLearning	49	4.34	1.09
Presentation of Topics	Frontal	675	4.06	1.23
	eLearning	49	4.45	1.04
Use of accessories	Frontal	670	4.91	1.14
	eLearning	49	4.89	1.23

Similar findings were found regarding the clarity of the explanations and their orderly presentation. The students in the virtual class rated the clarity of the explanations higher (4.5) than the students in the regular class (4.06). Here, too, the difference is statistically significant ( $t=2.1$ ;  $df =722$ ;  $sig<0.05$ ). Use of accessories (course guidebook, PowerPoint presentations, etc.) was rated almost equally by both groups (virtual class – 4.91, regular class – 4.89). The fact that students in the virtual classroom rated their understanding of the course materials higher than those in the regular classroom had no effect on their performance during the course. Three factors determined the overall achievements in the course:

- Performance – represents the results the company received (these, in turn, were directly affected by the decisions the team made) compared to the results of the other competing companies in the market. The (partial) grade reflecting this portion of the overall student results is identical for all members of a given team.
- Mid-term examination grade – this is an individual grade based on the student's mastery of the rules of the business simulation game and the ability to

analyze the management reports accompanying the game.

- Final grade – a weighted combination of the company's performance, the mid-term grade and other factors.

As Table 2 shows, there were no significant differences between the performances of the two groups (81.78 for the virtual group, 81.13 for the regular group, all on a basis of 0-100). Similarly, no significant differences were found in the mid-term examination (87.65 for the virtual group, 85.63 for the regular group).

**TABLE 1**  
COMPARISON BETWEEN FRONTAL  
AND THE ELEARNING PERFORMANCE  
MEASURES

	<i>Learning Method</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>
Performance Measure	Frontal	810	81.13	10.65
	eLearning	66	81.78	13.2
Score (exam)	Frontal	792	85.63	11.84
	eLearning	66	87.65	11.67
Final grade	Frontal	784	84.78	8.14
	eLearning	65	84.67	7.75

The final grade also showed no significant difference attributable to the learning method – the virtual class had an average of 84.67, the regular class 84.78. The business simulation game is conducted in predetermined groups and every week the team members had to make decisions about running the business they were in charge of. It was conceivable that the learning method – regular or virtual might affect their satisfaction with the course. When asked about their satisfaction (Table 3) with the teaching method, the students from the virtual class responded a little more favorably (average of 4.12) than their colleagues taking the course in the regular method (3.92). But these differences were not significant.

**TABLE 3**  
STUDENTS'S SATIAFCATION

	<i>Learning Method</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>
With teamwork	Frontal	596	4.61	1.28
	eLearning	41	4.48	1.26
With the Course	Frontal	496	4.39	1.33
	eLearning	41	4.00	1.36
With the Learning Method	Frontal	495	3.92	1.44
	eLearning	41	4.12	1.56

The satisfaction with the teamwork was not significantly different between the virtual group (average 4.48) and the regular group (average 4.61). Another question addressed the overall satisfaction with the course as a whole and here, too, no significant differences were found between the virtual group (average 4.0) and the regular group (average 4.39).

The students who participated in the course were given questionnaires at the beginning of the course, at mid-semester and at the end. They were asked about the games and their experiences with them. The questionnaires included sections about team decision-making, risk-taking in their decision processes, the use of modeling techniques to support their decision-making and about various team processes. The responses to these questions were analyzed by employing the Varimax technique for principal component analysis. The results showed that four components can be identified – risks, processes, decisions and the use of modeling that had a high reliability.

**TABLE 4**  
INDICES: RISKS, PROCESSES, DECISIONS AND MODELING

	<i>Learning Method</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>
Risks	Frontal	1855	4.85	.91
	eLearning	130	4.80	.87

Processes	Frontal	1869	4.72	.90
	eLearning	130	4.73	.84
Decisions	Frontal	1563	5.06	.79
	eLearning	106	5.20	.78
Modeling	Frontal	1660	4.75	.95
	eLearning	106	4.59	.93

After the indices were constructed, a comparison was made between the "regular" students and the "virtual" students. Answers, taken from both groups of students but in three different periods, were combined. Table 4 shows that there are no differences between the two groups, meaning that students used the same processes, took the same risks, made the same decisions and had the same attitude towards modeling, regardless of their study method – frontal or virtual.

In addition, in order to find out whether there were any behavioral differences between the students from the two groups – those who were taught frontally and those who were taught virtually – the respondents were asked to report the number of team members that participated in each team meeting, their favorite meeting method (face-to-face, over the phone or using the eLearning system. Network-based communications were made available to all students, regardless of their choice of learning method. Based on the actual experience of the "virtual" students, it was reasonable to assume that they would also prefer the same methods for their team meetings, whereas the "regular" students would choose face-to-face meetings. The Findings shows that in general this was not the case. The overall favorite meeting method among all groups was the standard face-to-face, and these meetings had more participants than other methods. During the initial two periods of the game, the "virtual" students used the eLearning system for team meetings, whereas the "regular" student did

not. That is, the "virtual" teams met both face-to-face and by using the virtual system for team meetings – more so than their friends from the regular class. After the two initial periods, this difference disappeared and students from the two systems preferred face-to-face meetings over the virtual meetings. In all, although the network-based communications infrastructure was made available to the students, almost no use was made of it.

The total time spent on team meetings was also examined: the length of face-to-face meetings, virtual meetings, phone conversations, email and other communication media. As the findings shows, the choice of the learning method – regular or virtual – had no effect on this time factor and thus no differences were discovered.

Another aspect of the course – for all students – was consultations with the teaching staff about the decisions that the students were required to make as part of the business simulation game. In this aspect, too, there were no differences between the groups in the time on these consultations.

A final part of the questionnaires, addressed only to the eLearning students, covered that method itself. As Table 5 shows, the students found the system easy to use (average of 4.83 on the 1 – 6 scale) and the lack of eye contact with the teacher did not bother them (average 2.6). However, even without the visual contact with the teachers, the students found the communications with the teachers to be good (average 4.36). They also found that paying attention to the lectures through the system was easy (average 4.75). The students gave a high rating to the system's capability for recording the classes for later playback (average 4.36) and even went further and strongly agreed with the statement that the recordings were sufficient for understanding the course even without being present during the live class itself (average of 4.87).

**TABLE 5**  
VIRTUAL TEACHING METHOD

	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>
The system is easy to work with	72	4.83	1.43
Lack of visual contact bothers me	60	2.61	1.74
It is easy to listen to the class	61	4.75	1.17
Communicating with the teachers is easy	73	4.36	1.42
I could learn from the recordings alone	58	4.87	1.25
The recordings were a benefit	57	4.36	1.34

A final question asked of the "virtual" students was whether they preferred the Internet-based method to the regular, frontal instruction. Most (59.5%) had no preference; 35.7 preferred the Internet-based eLearning method; and only a small minority, 4.8%, preferred the frontal method.

## VII. SIMILAR SURVEY AT THE SCHOOL OF ECONOMICS

In order to substantiate the findings of the previous research, a similar survey was conducted at the School of Economics. The school was established in 1994. It enrolls over 1,300 students. Students are trained with practical orientation in order to successfully integrate into the employment market in senior economy-related and managerial positions. The Business Simulation Game course is mandatory at both business and economics schools. The school of business focuses on managerial knowledge and skills, thus students at the school of business, who take the Business Simulation Game course, already have a solid background in finance, accounting, marketing and so on. On the contrary, the school of economics' curricula focuses on economics, and students who take the course lack managerial knowledge.

The survey was conducted over three semesters, and involved about 700 students who took the course in either synchronous eLearning or traditional frontal teaching method. The tables below present the school of economics' survey findings. The findings are presented in the same table format of the previous survey's findings.

**TABLE 6**  
EXPLANATIONS ABOUT THE COURSE –  
COMPARISON BETWEEN FRONTAL AND THE  
ELEARNING METHODS

	<i>Learning Method</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>
Explanations during sessions	Frontal	173	3.85	1.19
	eLearning	9	4.67	1.12
Presentation of Topics	Frontal	173	4.10	1.23
	eLearning	9	4.67	1.12
Use of accessories	Frontal	170	5.11	1.02
	eLearning	9	4.78	1.48

**TABLE 7**  
COMPARISON BETWEEN FRONTAL AND THE  
ELEARNING PERFORMANCE MEASURES

	<i>Learning Method</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>
Performance Measure	Frontal	373	80.34	10.38
	eLearning	25	81.40	14.70
Score (exam)	Frontal	364	84.37	12.07
	eLearning	23	85.22	10.17
Final grade	Frontal	358	84.24	7.96
	eLearning	23	85.67	8.75

**TABLE 8**  
STUDENTS'S SATIAFCATION

	<i>Learning Method</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>
With teamwork	Frontal	236	4.69	1.28
	eLearning	19	4.05	1.47
With the Course	Frontal	171	4.49	1.24
	eLearning	19	4.05	1.54
With the Learning Method	Frontal	170	3.97	1.37
	eLearning	19	4.16	1.80

**TABLE 9**  
INDICES: RISKS, PROCESSES, DECISIONS  
AND MODELING

	<i>Learning Method</i>	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>
Risks	Frontal	644	4.93	.94
	eLearning	42	4.68	.97
Processes	Frontal	646	4.83	.94
	eLearning	42	4.63	.84
Decisions	Frontal	525	5.06	.84
	eLearning	33	5.24	.75
Modeling	Frontal	586	4.92	.93
	eLearning	33	4.60	1.04

**TABLE 10**  
VIRTUAL TEACHING METHOD

	<i>N</i>	<i>Mean</i>	<i>Std. Dev</i>
The system is easy to work with	7	5.86	.38
Lack of visual contact bothers me	7	1.58	.79
It is easy to listen to the class	7	5.71	.49
Communicating with the teachers is easy	7	5.43	.98
I could learn from the recordings alone	7	5.29	.76
The recordings were a benefit	7	5.0	.82

The findings show that with the exception of a few minor, insignificant differences, both surveys demonstrate equal results. In spite of the different characteristics of the two schools and their students, the results suggest similar findings.

### **VIII. ANSWERS TO MAIN RESEARCH QUESTIONS - SUMMARY**

- There were no differences in the course achievements and grades between those students that took the frontal course and those that took it using the eLearning method.
- No correlation existed between the management meeting method and the achievements in the course.
- At the group level, too, there were no differences in achievements and grades between those groups that took the course using the traditional method and those that took it using the eLearning method.
- There were no differences between the two groups in the time the students from each group spent on their internal management meetings. Special attention was given to this issue, because we were interested to see if there were any learning patterns, particularly in those groups that used the eLearning method. It turned out that there were no differences between groups using the two methods throughout the semester. The same result was observed in the analysis of all the weekly questionnaires.
- No differences were found in the level of student satisfaction between the two groups.
- Satisfaction from the quality of the instruction given during the classes was significantly higher among the students that took the eLearning classes. Similarly, the students that took the eLearning classes were more satisfied

with the learning materials than their colleagues in the frontally taught classrooms. This was not the result of superior teaching since the same teachers gave sessions using both methods.

### **IX. CONCLUSIONS**

The results show that a synchronous, distance-learning method for teaching a business simulation game course neither diminishes the course's effectiveness nor does it affect student performance. The grades of the students taking the distance learning course were essentially the same as that those of their colleagues who were taught conventionally during the same semester. On the contrary, if there was any difference in the results – taken broadly to include not only the grades and the achievements of the students, both individually and in groups, but also the overall satisfaction from the course and from the learning method – this difference was in favor of the eLearning method. Those students who took the course based on the distance-learning method had a significantly better learning experience than their colleagues in the conventionally taught course.

Although the teaching method (regular or virtual) had no effect on student performance of in the course and game, we saw that there was a difference when it came to decision-making team meetings prior to the scheduled time for handing in those decisions. The students in both groups could choose to set up face-to-face meetings or virtual meetings through the eLearning system. It was expected that students who took the course in the conventional way would prefer normal face-to-face meeting while those in the virtual course would prefer the convenience of the electronic tools with which they had been provided to set up Internet-based meetings. These expectations were indeed fulfilled during the initial periods of the game and the students who took the virtual

course preferred using the Internet for their decision-making sessions, while the students in the regular course preferred face-to-face meetings. However, after two periods into the game, the teams taking the virtual course changed their meeting preferences and began meeting face-to-face. While this might indicate some technical difficulties in using the eLearning system for meetings, the evidence does not support this explanation since the virtual class students found the system easy to work and encountered no technical problems in operating it.

Very possibly this change in preferences may be explained by a social need – the desire to see and meet teammates during the very intensive decision-making sessions. These weekly sessions created social cohesion among the team members which the virtual system disturbed. That is to say, the virtual system, where the team members are not sharing a room for the highly charged decision-making sessions fostered a sense of alienation. Another, more prosaic explanation that the authors find more plausible is that the students – who take a number of courses during the week, in addition to the Business Simulation Game – simply set up their meeting for a time just before or just after some classes for the sake of convenience and expediency.

The business simulation game is a unique course in the sense that most of the teaching hours allocated to it are not lectures delivered by the teachers, but rather consulting meetings for analysis and decision-making. It also requires intensive efforts by the students within their teams. Thus, it is possible that the results obtained in this research were also unique, influenced by the specific nature of this course. In order to understand better the effects of eLearning, more research will have to be done on courses where the whole curriculum is based on frontal lectures vs. an eLearning

(synchronous) rendition of the same course. A comparison of achievements and satisfaction levels among students taking the same course but by different methods would sharply delineate the advantages and disadvantages of the two methods.

In conclusion, we find that it is fair to conclude that eLearning courses requiring intensive interactions among the participating students can be taught using the synchronous eLearning method.

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