OTLA: A NEW MODEL FOR ONLINE TEACHING, LEARNING AND ASSESSMENT IN HIGHER EDUCATION

By

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ABSTRACT

The study examined a new asynchronous model for online teaching, learning and assessment, called OTLA. It is designed for higher-education institutions and is based on LMS (Learning Management System) as well as other relevant IT tools. The new model includes six digital basic components: text, hypertext, text reading, lectures (voice/video), exercises (optional and compulsory) and a final computerised exam. It is accompanied by deep daily involvement of the course lecturer. The research was based on two samples of students studying in two colleges ($n_1 = 50$, $n_2 = 46$) who participated in OTLA courses. All students were asked to answer the same questionnaire focused on three areas: the course components, characteristics of learning process and time investment. Besides, achievements of an OTLA course were compared to the same course in a "face to face" format. The research reveals that according to students' views, the new model is very helpful for their studying process. Furthermore, achievements in an OTLA course were found to be equal or better in comparison to an equivalent face-to-face course. The study's results point out that there is a significant worthiness to adopt the new model in universities and colleges.

Keywords: OTLA, Online Teaching, Computerised Assessment, Learning Management System, Synchronous Learning, Asynchronous Learning.

INTRODUCTION

The New Model

The study introduces a new asynchronous model for online teaching, learning and assessment, called OTLA. The new model is designed for higher-education institutions and is based on a Learning Management System (Moodle or equivalent) as well as other relevant IT tools. The fundamental model which has been examined during this study is adequate to wordy courses. However, based on minor changes, it can be appropriate to other types of courses (as mentioned later).

The course website is divided into main topics and is open to registered students. The new model is intended to be a full replacement for "face-to-face" courses. It includes the following six digital components:

Text: All relevant texts are included in the course website (created in LMS such as Moodle) so students do not have to make an effort for collecting any bibliographical items needed. All texts are in a pdf format (including relevant links), so students can read them on screen, print, search or save the files. It enables them to do all these activities without the need to buy any software besides the free Adobe Reader. Texts are divided to main topics.

Hypertext: The pdf texts include relevant links (not too many) designed to add explanations for difficult notions or supplementing examples. The texts include links to text reading and/or recorded lectures as well.

Text Reading: Each topic in a wordy course is accompanied by voice files helping students to listen to text reading. This component is especially crucial for students whose first language is not the same as the course tongue. Students can activate the voice links from the relevant page (each page separately) or from a main link that is adequate to the whole topic. It is possible to listen to text reading online or to download the files in order to listen later, using any supportive device.

Lectures (voice/video): Each topic is accompanied by a lecture which the lecturer records in "lab conditions", namely, not during a live lesson. The advantage of such a recording is that it is shorter and more efficient

because there is no wasting of time or disturbances characterising live lessons. The recording might be based on the following two alternatives:

- *Voice Only:* This option is appropriate, especially for wordy courses in which students do not have to "watch things" while listening to the lecture. Voice files can be uploaded to the course website.
- *Video:* It might be applicable to other types of courses in which it is essential to "watch things" during the lecture, such as formulas, mathematical expressions, diagrams, pictures, computer screens or equivalent. In that situation, it is preferable to upload video files in HD quality to YouTube and to link them to the course website. In that way, there is no limit of video length or file size, the institutional server is not loaded, it is completely free and reliable, and it can be presented in high resolution.

A recorded lecture is an asynchronous replacement for a live lecture given in a classroom. Each lecture's topic is recorded for every text-page separately. After creating all separate files, they are combined to create one complete file covering the whole topic. In this way, students can activate a lecture's link from every text page or from a main link activating a complete lecture of a certain topic. It is possible to listen to the lectures online or download the voice files. A recommended format for voice files is mp3 because it is common, and it supports most types of hardware and operating systems. In order to record video clips (for other types of courses mentioned above), it can be undertaken via relevant video-capture applications. Appropriate tools might be Camtasia, Microsoft PowerPoint, Microsoft Community Clips (free software) or equivalent. If the lesson includes handwriting, it can be recorded by a suitable tablet application enabling recording of handwriting, voice and slides (such as "ShowMe" running on iPad).

Exercises: There are two types of exercises -optional and compulsory. An optional exercise is intended to summarize the learning process of a certain topic, being an effective preparation for the compulsory one. Optional exercises are about to be mainly formative assessment and are not included in the final score. A compulsory exercise is intended to be summative assessment for the relevant topic, and it has a certain weight in the final grade (for example: 20% for all exercises together). Every compulsory exercise can have a time limit ensuring that all learning process would be accomplished by the end of the semester. After that deadline, students are not able to submit the relevant exercise, unless the lecturer confirms a delay. In such a way, students are in a binding framework during the whole semester.

Each exercise includes a few questions and may have permitted time duration. The time clock starts counting only after a student starts answering. There should be different questions in an optional and compulsory exercise covering the same topic. Exercises can be prepared and delivered via a learning management system such as the Moodle or an equivalent Internet application.

For example, in a course, including five topics, there will be five optional and five compulsory exercises. If the total weight is 20%, each compulsory exercise will have a contribution of 4% to the final grade. It is possible (and even desired) to enable students to submit an exercise (optional or compulsory) more than once in order to improve their learning. In such a case, subsequent submissions should be based on new questions.

Exercises (both optional and compulsory) can be prepared by a specific tool of CAA (Computer Assisted Assessment). A recommended one exists in the Moodle, and it can create a lot of kinds of questions such as, multiple choice, drag and drop, matching, essay, short open answer, numerical, ordering, selection of missing words, true/false and more. It is possible to create a question bank and to assign questions to topics. In each exercise (or exam), questions can be randomly selected and therefore, it is worthwhile to create a large question bank. In such a way, different exercises (or tests) can be automatically created, covering selected topics.

Final Computerised Exam: The final exam can be given in class or at home and is similar to the compulsory exercises, excluding the following differences: it covers all the topics of the course, its time duration is longer, and it should include new questions, not those given before. The exam can be prepared by the same tool used for the exercises

(such as the Moodle). If the final exam is undertaken just at the college/university, it is possible to block students' entry from other locations. Such a block is possible by defining specific IP addresses relating to the institution's classrooms only.

Besides the technological components, the new model includes another very crucial factor, namely, a lecturer's involvement. The lecturer should have deep and daily involvement in what students do and how they advance. That involvement depends on the following elements:

Continuous Monitoring of Students' Progress: It can be done by checking students' entries to the course web-site and examining their exercises. It might be helpful for ensuring that students advance appropriately.

Giving Assistance to Students in Real Time: Students' queries are divided into two basic types.

- Academic Issues: Questions and answers should be sent and answered by diverse ways of communication, such as email, phone, sms, Skype, Facebook Messenger, Whats App, Line or equivalent tools. Answers should be sent to students as quickly as possible so their learning process would not be delayed.
- Technical Issues: Reasonable technical functioning of every student is a necessary (and insufficient) condition for OTLA. Any technical problem might severely hurt students' advancement, unless it is handled rapidly and efficiently. One of the best ways to assist students in technological difficulties is to use applications designed to control distant computers. Tools like TeamViewer, LogMeIn or Ammyy, can enable remote support and might save time and efforts while students experience technical troubles.

It is quite obvious that in order to prepare, run or update an OTLA course, the lecturer should be familiar with educational information and communication technologies. Important capabilities required are using LMS (Moodle or equivalent), pdf applications, hypertext creation, voice recording, video capture, CAA (Computer Assisted Assessment) and techniques for computers' remote control.

General Background

A common definition for online learning is as follows:

Learning that takes place partially or entirely over the Internet. (Means, Toyama, Murphy, Bakia, & Jones, 2010).

This definition excludes purely print-based correspondence education, broadcast television or radio, video conferencing, videocassettes, and stand-alone educational software programs that do not have a significant Internet-based instructional component. There is a clear distinction between two purposes for online learning:

- Learning conducted totally online as a substitute or alternative to face-to-face learning.
- Online learning components that are combined or blended with face-to-face instruction to provide learning enhancement (Means et al., 2010).

Online learning courses include both content and instructional methods that help people learn the content. They are delivered via digital devices such as computers and smart phones using words in the form of spoken or printed text and pictures such as illustrations, photos, animation, or video. Online learning lessons are intended to help learners reach personal learning objectives (Clark & Mayer, 2011).

One of the significant problems of educational technology is that when focusing too much on the role of cutting-edge technology, the important role of the learner might be ignored. Cuban (1986) has described the history of educational technology since the 1920s, including motion pictures in the 1920s, educational radio in the 1930s and 1940s, educational television in the 1950s and programmed instruction in the 1960s. In each case, strong claims were made for the potential of the cutting-edge technology of the day to revolutionize education, but in each case, that potential was not reached. The reason for the disappointing history of educational technology may be that instructors expected learners to adapt to the technology and therefore, did not design learning environments that were consistent with the way people learn.

Therefore, one of the main challenges in e-courseware is

how to adapt technology to aid human learning. A learner-centred approach might be an appropriate solution. Such a paradigm is focused on how people learn and technology is adapted to the learner in order to assist the learning process (Mayer, 2009). The rationale for taking a learner centred approach is that it has been shown to be more effective in promoting productive learning. A learner-centred approach does not rule out the use of new technological innovations. It does, however, require the adaptation of those innovations in ways that support human learning processes (Mayer, 2011).

Online learning has roots in the tradition of distance education, which goes back at least 100 years to the early correspondence courses. With the advent of the Internet and the World Wide Web, the potential for reaching learners around the world increased greatly, and today's on-line learning offers rich educational resources in multiple media and the capability to support both real-time and asynchronous communication between instructors and learners as well as among different learners. Institutions of higher education and corporate training were quick to adopt online learning.

Online learning has become popular because of its potential for providing more flexible access to content and instruction at any time, from any place. Frequently, the focus entails (i) Increasing the availability of learning experiences for learners who cannot or choose not to attend traditional face-to-face offerings, (ii) Assembling and disseminating instructional content more cost-efficiently, or (iii) Enabling instructors to handle more students while maintaining learning outcome quality that is equivalent to that of comparable face-to-face instruction.

Different technology applications are used to support different models of online learning. One class of online learning models uses asynchronous communication tools to allow users to contribute at their convenience. Synchronous technologies are used to approximate face-to-face teaching strategies such as delivering lectures and holding meetings with groups of students. Earlier online programs tended to implement one model or the other. More recent applications tend to combine multiple forms of synchronous and asynchronous online interactions as well as occasional face-to-face interactions (Means et al., 2010).

In addition, online learning offerings are being designed to enhance the quality of learning experiences and outcomes. One common conjecture is that learning a complex body of knowledge effectively requires a community of learners (Bransford, Brown and Cocking, 1999; Riel and Polin, 2004; Schwen and Hara, 2004; Vrasidas and Glass, 2004) and that educational technologies can be used to expand and support such communities. Another conjecture is that asynchronous discourse is inherently self-reflective and therefore, more conducive to deep learning than is synchronous discourse (Harlen and Doubler 2004; Hiltz and Goldman, 2005;Jaffe, Moir, Swanson, & Wheeler, 2006).

Conceptual Framework

There are three key components describing online learning:

- Whether the activity served as a replacement for or an enhancement to conventional face-to-face instruction.
- The type of learning experience (pedagogical approach).
- Whether communication was primarily synchronous or asynchronous.

One of the most basic characteristics for classifying online activities is its objective: whether the activity serves as a replacement for face-to-face instruction or as an enhancement of the face-to-face learning experience. This distinction is important because the two types of applications have different objectives. A replacement application that is equivalent to conventional instruction in terms of learning outcomes is considered a success if it provides learning online without sacrificing student achievement. If student outcomes are the same whether a course is taken online or face-to-face, then online instruction can be used cost-effectively in settings where too few students are situated in a particular geographic locale to warrant an on-site instructor (e.g., rural students, students in specialized courses). In contrast, online enhancement activities that produce learning outcomes

that are only equivalent to (not better than) those resulting from face-to-face instruction alone would be considered a waste of time and money because the addition does not improve student outcomes (Means et al., 2010).

A second important dimension is the type of learning experience, which depends on who (or what) determines the way learners acquire knowledge. Learning experiences can be classified in terms of the amount of control that the student has over the content and nature of the learning activity. In traditional didactic or expository learning experiences, content is transmitted to the student by a lecture, written material, or other mechanisms. Such conventional instruction is often contrasted with active learning in which the student has control of what and how he or she learns. Another category of learning experiences stresses collaborative or interactive learning activity in which the nature of the learning content is emergent as learners interact with one another and with a teacher or other knowledge sources. Technologies can support any of these three types of learning experience:

- Expository Instruction: Digital devices transmit knowledge.
- Active Learning: The learner builds knowledge through inquiry-based manipulation of digital artifacts such as online drills, simulations, games, or micro-worlds.
- Interactive Learning: The learner builds knowledge through inquiry-based collaborative interaction with other learners; teachers become co-learners and act as facilitators (Means et al., 2010).

This dimension of learning-experience type is closely linked to the concept of learner control explored by Zhang (2005). Typically, in expository instruction, the technology delivers the content. In active learning, the technology allows students to control digital artifacts to explore information or address problems. In interactive learning, technology mediates human interaction either synchronously or asynchronously; learning emerges through interactions with other students and the technology. The learner-control category of interactive learning experiences is related to the so-called "fifth generation" of distance learning, which stresses a flexible combination of independent and group learning activities. Researchers are now using terms such as "distributed learning" (Dede, 2006) or "learning communities" to refer to orchestrated mixtures of face-to-face and virtual interactions among a cohort of learners led by one or more instructors, facilitators or coaches over an extended period of time (from weeks to years).

Finally, a third characteristic commonly used to categorize online learning activities is the extent to which the activity is synchronous, with instruction occurring in real time whether in a physical or a virtual place, or asynchronous, with a time lag between the presentation of instructional stimuli and student responses.

Research findings point out that there are advantages for asynchronous over synchronous distance education (Bernard, Abrami, Lou, Borokhovski, Wade, Wozney, Wallet, Fiset, & Huang, 2004). In examining a different set of studies, it was found that studies of distance-learning applications, which combined synchronous and asynchronous communication, tended to report more positive effects than did studies of distance learning applications with just one of these interaction types (Zhao, Lei, Yan, Lai, & Tan, 2005). Zhao et al. (2005) also found advantages for blended learning ("Face-to-Face Enhancement") over purely online learning experiences. They also found advantages for courses with more instructor involvement compared with more "canned" applications that provide expository learning experiences.

The Study Framework: Examining OTLA Model

Students' perceptions toward three OTLA wordy courses, were examined in two colleges during 2011-2013, as follows:

College A (The Department of Management at the Neri Bloomfield School of Design and Education, Haifa, Israel):

- Entrepreneurship (B.A - fourth year).
- Management of technology (B.A - third year).

For most students, the courses' language was not their first tongue, so text reading was extremely important. Both courses included all OTLA components mentioned above except recorded vocal lectures that were included just in 2012-2013. The final exam existed at the college only (not at home), and it was allowed to use any reference material.

College B (The Department of Educational Management at Jerusalem College, Israel):

Theories in educational management and leadership (M.A).

For all students, the course language has been their first tongue, so text-reading was not used (only recorded vocal lectures). The final exam existed at home only, and of-course it was allowed to use any reference material.

Furthermore, the course "entrepreneurship" (college A), was taught for ten tears (2002-2003 – 2012-2013, except 2004-2005). During the first seven years, it was taught in class whereas in the last three years, its format was changed to OTLA. During all these ten years, the course was instructed by the same lecturer and included the same contents and equivalent exams. A comparison of students' achievements during this period of time was undertaken in order to find out if there is a significant difference between both formats (face-to-face and OTLA). The other two courses were taught a priori in OTLA format, so such a comparison was unfeasible.

Method

The Research Questions

The research questions intended to measure the effectiveness of the new OTLA model in higher-education institutes. The model's effectiveness was measured relating to two aspects:

- Students' perceptions towards the new model.
- Real outcomes in an OTLA course compared to the same course given in a traditional face-to-face format.

The Following Research questions were worded:

- How do students perceive inputs (hypertext, recorded lectures, assistance and exercises), the learning process (its effectiveness, flexibility and comfort) and time pressure and investment in an OTLA course?
- Is there a significant difference in students' achievements in OTLA in comparison to a face-to-face course?

Population and Samples

Population

The population addressed through the study included all students at the Neri Bloomfield School of Design and Jerusalem College.

Samples

Relating to students' perceptions (the first research question), there were four samples including 96 students overall who studied one OTLA course at least. Respondents' frequency is shown in Table 1.

Students were asked to answer a questionnaire at the end of the first semester of each academic year (2011-2012, 2012-2013), concerning their perceptions towards the new OTLA model.

The questionnaire was anonymous, and the rate of response was as follows

College A: 51.02% (50 out of 98).

College B: 74.19% (46 out of 62).

General rate of response: 60% (96 out of 160).

Relating to real outcomes (the second research question), there were two additional samples (College A only) including all students who studied the course "entrepreneurship" in class, during 7 years from 2002-2003 to 2009-2010 (excluding 2004-2005), and those who studied the same course via the OTLA model during three years, from 2010-2011 to 2012-2013 ($n_1 = 106$, $n_2 = 73$ *r*espectively).

Tools

In order to answer the first research question, a questionnaire, including 34 closed statements was prepared. The questionnaire was given to students in both colleges who studied at least one of the three courses mentioned above.

For each question, the respondents were requested to mention their views on the following Likert five-point scale:

- Strongly disagree
- Mostly disagree
- Moderately agree
- Mostly agree
- Strongly agree

In addition to these statements, the questionnaire included two open-ended questions as well. They were designed to

	2011-2012	2012-2013	Overall
College A	27	23	50
College B	31	15	46
Overall	58	38	96

Table 1. Questionnaire – Respondents' Frequency

accomplish the main data gathered by the quantitative part of the questionnaire, as follows:

- Are there any additional advantages/disadvantages to OTLA beyond what has been mentioned earlier?
- Do you prefer OTLA over face-to-face studying?

Data Analysis

Questionnaires

In order to examine the validity of the questionnaire, the factors' reliability was calculated (Cronbach's alpha). Item analysis was undertaken as well in order to improve reliability. Based on the reliability found, the following eight factors were divided to the following three groups:

Inputs

- Hypertext: Hypertext's contribution for learning.
- Lectures/Text Reading: The influence of listening to lecturer's recordings on learning.
- Lecturer's Assistance: The possibility to get assistance from the lecturer.
- Exercises: The effectiveness of optional and compulsory exercises and the extent to which the exercises reflect real knowledge.

Learning Process

- Learning Effectiveness: Understanding of the course material, the extent by which texts are clear, effectiveness of learning process and advancement, efficiency of learning process, preference of online courses, readiness for the final exam, difficulties during the online learning, effectiveness of online learning in comparison to face-to-face learning, fear of failure.
- Learning Flexibility and Convenience: Convenience of an online course, its flexibility, the option to choose when to study and when to submit exercises, time saving, enjoyment of online courses, easiness of online learning, the possibility to ask questions and receive answers in real time.

Time

- Time Pressure: Time pressure and its influence.
- Time Investment: Time investment in online courses.

For each factor, there was found a high value of reliability (ranges from 0.569 to 0.932). Every factor (having more than one item) has been determined by calculating the mean value of the items composing it.

Table 2 summarizes the eight factors, the items composing them and the reliability.

For each factor, a mean score was calculated (including standard deviation). The following statistical tests have been undertaken as well ($\alpha<=0.05$).

- Independent Samples T-test: In order to check significant differences of factors' means between 2011-12 and 2012-13 (for each college).
- Paired Samples T-test: It was conducted for checking significant differences between pairs of factors.

Comparison of Achievements

In order to examine the differences between students' achievements in both formats (face-to-face and OTLA), a mean score was calculated for the course "entrepreneurship" for each year (from 2002-2003 to 2012-2013, except 2004-2005 in which the course was not given). Paired Samples T-test has also been undertaken ($\alpha<=0.05$) in order to check if these differences are statistically significant.

Results

College A

Relating to the questionnaire, there was no significant difference between the years 2011-2012 and 2012-2013 concerning the mean scores of all factors (T-test, $\alpha \leq 0.05$). It means that there was a replication of the results found in the first year (2011-12) also in the second one (2012-13). It strengthens the findings and gives them more validity. Therefore, mean factors' scores are presented for both years together in Table 3.

Table 3 introduces the following findings (relating to the first research question).

- Concerning the inputs (the first four factors), students rate all OTLA's inputs with high scores. The contribution

Groups	Factors	Questionnaire's questions
Inputs	Hypertext Lectures and text reading Alpha=0.818	The hypertext is helpful for learning. Listening to the lecturer's recordings helps learning. I use to listen to the lecturer's recordings.
	Lecturer's assistance: Alpha=0.569	It is possible to get assistance from the lecturer. I got help from the lecturer during the course.
	Exercises: Alpha=0.682	The optional exercises are helpful. The mandatory exercises are helpful. The mandatory exercises reflect my knowledge.
Learning process	Learning effectiveness: Alpha=0.932	I could understand well the material. The texts in the course website are clear and understood. During the semester, I had a successful learning process. The course enables me to advance along the whole semester. The online learning is efficient. I prefer an online course. Towards the end of the semester, I feel ready for the exam. I had no difficulties during the online learning. Online learning is more effective than face-to-face learning. The learning process of an online course is effective. I expect to have a high grade in the course. I am not afraid of failure in the course.
	Flexibility and convenience: Alpha=0. 926	It is convenient to study in an online course. An online course has much flexibility. The option to study when I wish is helpful. The option to submit exercises when I wish is helpful. Online learning saves time. I enjoy online courses. There is flexibility relating to exercises' submission dates. It is easy to study in an online course. I can ask the lecturer questions any time and get answers.
Time characteristics	Time pressure: Alpha=0.899	There is time pressure in the course. Time pressure in the course disturbs me.
	Time investment	I invest much time in an online course.

Table 2. Factors and Reliability

of the exercises (4.36), hypertext (4.29), lecturer assistance (4.26) and lectures/text reading (3.97) is substantial. There was no significant difference between these four factors, except the first and the fourth ($t_{(49)} = -2.56$. $p = .013$).

- The Learning Process: The learning process is perceived to be very effective, especially the flexibility and convenience of learning (4.26). The second factor (learning process effectiveness) has also a high score (3.89). There is a significant difference between these factors ($t_{(49)} = -6.63$, $p = .000$).
- Time Characteristics: Time pressure is moderate (3.2) whereas students invest quite much time for learning (3.88). There is a significant difference between these two factors ($t_{(49)} = -4.28$, $p = .000$).

The open-ended questions strengthen the closed

Groups	Factors	N	Mean	Std. Deviation
Inputs	Exercises	50	4.36	.63
	Hypertext	48	4.29	.77
	Lecturer assistance	50	4.26	.81
	Lectures/text reading	50	3.97	1.03
Learning process	Flexibility and convenience of learning	50	4.26	.66
	Learning process effectiveness	50	3.89	.69
Time characteristics	Time investment	50	3.88	.92
	Time pressure	50	3.20	1.25

Table 3. College A-Mean Factors for 2011-2012 and 2012-2013 Together (Descending Order in Each Group)

statements as shown in the following quotes (college A, 2012-2013):

"I prefer the OTLA model because it enables me to study other courses and work full time" (a student who participated in both courses - entrepreneurship and technology management).

"There is a huge advantage to OTLA owing to the way contents are displayed, the many examples existed and the great availability of the lecturer" (entrepreneurship).

"In a long-winded course, I prefer the OTLA model because it is much easier to learn when I have time and in my own rate" (technology management).

"I prefer the OTLA model because it saves time, it is easier and when I need any help, the lecturer supports me immediately" (entrepreneurship).

"In such a course, I prefer online learning since it includes mainly texts. Although we do not meet the lecturer, he is available for answering questions, so there is no problem" (technology management).

"I prefer the OTLA model because I also work, and it enables me to study at work. The main advantage is that the course is very flexible and enables access at any time." (technology management).

"In such courses I prefer the online learning because they include theoretical material which I have to read and understand. It is better to do it in my own private time. If the course was face-to-face, I would have felt that I waste time for things I can do my own in my free time. Furthermore, the wonderful recordings that our lovely lecturer has prepared help us a lot"

(entrepreneurship and technology management).

Additional insight is developed by the open-ended questions answered by another college A student (2011-2012):

> "*I prefer online learning. In my view, the compulsory exercises which constitute 20% of the final grade help me to study the material and understand it well. The notion of optional exercises is excellent, and it helps practicing how to stand in the time allotted as well as better understanding of the material. Online learning is very efficient, and it gives students personal responsibility and independence*" *(entrepreneurship).*

The quotes mentioned above stress the great flexibility, efficiency, easiness, and effectiveness of the learning process in the OTLA model. They also emphasise that the lecturer's daily involvement is crucial for ensuring success in such a course. Both exercises (optional and compulsory) are perceived as a significant component of the learning process.

Relating to the second research question, Table 4 shows students' mean grades in "entrepreneurship" for each year, from 2002-2003 to 2012-2013 (except 2004-2005):

Table 4 combined with Tamhane post hoc test, shows that there were no significant differences among students' grades in all ten years except the following, in which differences were significant:

- 2006-2007 and 2002-2003 (Tamhane post hoc test, p=0.019): in both years the course was face-to-face.
- 2011-2012 and 2012-2013 (Tamhane post hoc test, p=0.048): in both years the course was OTLA.
- 2002-2003 and 2011-2012 (Tamhane post hoc test, p=0.009): face-to-face and OTLA.

The meaning of these findings is that there was no significant difference between face-to-face mean grades to those of OTLA. The only exception is 2011-2012 and 2002-2003 where OTLA mean grade was significantly higher (89.63 versus 75.18). It means that OTLA mean grades are at least the same as those of "face-to-face" or even greater.

College B

Relating to the questionnaire, there were no significant differences between the years 2011-2012 and 2012-2013 concerning the mean scores of the following factors (T-test, $\alpha \leq 0.05$): lecturer assistance, hypertext, lectures/text reading and time pressure. It means that there was a replication of the results found in the first year (2011-12) also in the second one (2012-13) relating to these factors. Therefore, these mean factors' scores are presented for both years together in Table 5. For the other four factors, there were significant differences between the two years. In all these cases, there was a substantial improvement in the second year (2012-2013). Therefore, these mean factors' scores are presented in Table 5 separately for each year.

Type	Year	Mean	N	Std. Deviation
Face-to-face	2002 - 2003	75.18	22	14.312
	2003 - 2004	78.80	20	11.972
	2005 - 2006	83.71	14	9.110
	2006 - 2007	90.33	12	8.172
	2007 - 2008	80.92	13	11.094
	2008 - 2009	79.90	10	13.102
	2009 - 2010	85.07	15	6.840
OTLA	2010 - 2011	83.00	22	9.626
	2011 - 2012	89.63	24	7.983
	2012 - 2013	76.48	21	14.895
Total		82.06	173	11.989

Table 4. College A-Mean Grades in "Entrepreneurship" From 2002- 2003 to 2012-2013 (Ten Years)

Table 5 shows the following findings relating to college B (concerning the first research question).

- Regarding the inputs (the first four factors), students in college B also rate all OTLA's inputs with high scores. The contribution of the exercises (4.38 – second year), lecturer assistance (4.15), hypertext (3.62), and lectures (3.50) is substantial. There was no significant difference between these four factors, except the first and the third ($t_{(44)} = -2.69$, $p = .010$) and the first and the fourth ($t_{(45)} = -2.54$, $p = .014$).
- The Learning Process: The learning process is perceived to be very effective in the second year (2012-2013): flexibility and convenience of learning (4.77) and learning process effectiveness (4.72) got tremendously high scores (the difference between these two factors was insignificant). These two factors got high scores in the first year as well (4.09 and 3.77 respectively). In this case, there is a significant difference between these factors ($t_{(30)} = -4.037$, $p =$

Groups	Factors	Year	N	Mean	Std. Deviation
Inputs	Lecturer assistance	2011 - 2013	46	4.15	1.211
	Exercises	2011 - 2012	31	3.67	.991
		2012 - 2013	15	4.38	.628
	Hypertext	2011 - 2013	45	3.62	1.248
	Lectures/ text reading	2011 - 2013	46	3.50	1.520
Learning process	Flexibility and convenience of learning	2011 - 2012	31	4.09	1.072
		2012 - 2013	15	4.77	.276
	Learning process effectiveness	2011 - 2012	31	3.77	.919
		2012 - 2013	15	4.72	.298
Time characteristics	Time investment	2011 - 2013	46	3.72	1.129
	Time pressure	2011 - 2012	31	3.11	1.200
		2012 - 2013	15	2.00	.964

Table 5. College B-Mean Factors for 2011-2012 and 2012-2013

.000).

- Time Characteristics: According to second year's students (2012-2013), time pressure is quite low (2.00) whereas students in the first year (2011-2012) report time pressure is higher (3.11). Relating to time investing, students report they invest quite much time for learning (3.72). There is a significant difference between time investment and time pressure in college B (both years together $-t_{(45)} = -3.89$, $p = .000$).

The open-ended questions strengthen the closed statements as shown in the following quotes (college B, theories in educational management and leadership, 2012-2013):

> "*OTLA is much more effective and practical than traditional learning. It is easier to study and assimilate the material. The flexibility helps a lot to the learning process. The course was very interesting and clear and the texts were readable and pleasant. The voice recordings were interesting and helpful for understanding and of course, the lecturer's support was outstanding*".
>
> "*I love the OTLA model very much. During the last years, I have learned in some online courses, and this is the first which I enjoyed the professionalism, the high level of studying and the taking into account of different learning styles (visual and auditory). This is the first online course in which I felt that learning was more meaningful than learning in the classroom. The course is clear, professional, and accessible (texts, recorded lectures, video clips, links and kindness and availability of the lecturer). All these have undoubtedly contributed to the quality and efficiency of the learning*".

2011-2012:

> "*Usually I prefer traditional learning in the classroom. This is the first time in which I was exposed to OTLA. I feel that this course was very important and I could study very well*".

The quotes mentioned above stress the great perceived effectiveness of OTLA. It is viewed as better than traditional learning and also preferable in comparison to other online courses which M.A students have experienced.

Discussion

The OTLA asynchronous model is a complete substitution for face-to-face learning. It includes a comprehensive basis of any academic course, namely, teaching, learning and student assessment, and it combines these three fundamental factors via Internet technologies. The model has been examined in two institutions of higher education and the findings show it can be an excellent way for transferring academic courses in universities and colleges.

As Mayer (2009) claims, one of the main challenges in

E-courseware is how to adapt technology to aid human learning. Indeed, the OTLA model succeeds to make an effective link between learning needs and technology. One of the prominent findings of the study is that OTLA enables students to gain what they need a lot – flexibility combined with effective and efficient learning. According to Means et al. (2010), online learning has become popular because of its potential for providing more flexible access to content and instruction. The research literature stresses also the advantage of asynchronous learning versus synchronous, because of its ability to deep learning (Harlen and Doubler 2004; Hiltz and Goldman 2005; Jaffe et al. 2006). In the new asynchronous OTLA model, flexibility becomes not only a matter of convenience, but it has also a direct influence on learning effectiveness. According to students who participated in such courses, learning in their own private time is much more effective and efficient than sitting in a classroom and listening passively. In such a way,

students become active learners and this change improves the whole learning process significantly.

OTLA is based on digital text and hypertext, recorded lectures and/or text reading and exercises (optional and compulsory). Nevertheless, such a course cannot be conducted without deep daily involvement of the lecturer who is about to manage the learning. Because there are no face-to-face meetings, alternative interaction between the lecturer and the students is extremely important. In many occasions, students may feel lonely or helpless while sitting in front of their computer. In that sense, the lecturer should be responsible for giving some human touch, even though there are no personal meetings. He or she should be attentive and patient about students' needs and communicate with them on a daily basis.

The research reveals that the new model which is a replacement for face-to-face instruction, is effective not only as a result of students' satisfaction. This conclusion is based on real outcomes as well, namely students' achievements. According to the literature, a replacement application that is equivalent to conventional instruction in terms of learning outcomes is considered a success if it provides learning online without sacrificing student achievement (Means et al., 2010). Indeed, the research deals also with students' achievements in a course (entrepreneurship) that was taught during seven years in a traditional manner and three years by OTLA. The study's findings show that achievements were at least the same or even better in the new model. This evidence gives additional validity to the study and its findings.

Besides the academic advantages introduced by the research, it is quite obvious that online learning has clear administrative advantages for the institute, the students and the academic staff, mainly, because it saves resources (classrooms, electricity, traveling and so on). If it has both academic and administrative benefits, the worthiness of adopting the new model increases significantly, and that might be a great contribution to universities and colleges all over the world.

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