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Nautical Web-Based Asynchronous Training Environments: Student Motivators

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ABSTRACT

This study examined the relationships between various characteristics college student, and the ones from Nautical in particular, against the advantages and disadvantages perceived by the students, to access an online course. We have been trying to find indicators that allow us to help those nautical students who are not able to face courses and their only alternative is to make distance learning in the form of online courses.

In this paper we propose asynchronous format courses, successfully tested at the University of Texas at Arlington. This University has worked with the University of La Laguna to try this kind of on-line course in the teaching of postgraduate scope of the simulation.

Students have accessed to course materials of theoretical presentations in classes, practical exercises of the engine room and cargo handling simulator which are installed at the ETS Nautica, Máquinas and Radioelectrónica Naval of the University of La Laguna. Those are stored on the server school, with the advantage that students can access them anytime and anywhere.

The data presented in this study provides supporting evidence of support online courses applied to both Graduate and Master studies and research, but especially for those professionals who have to perform, in Spain, the professional training and update business cards, and who obviously for the reasons of working in the world of the merchant marine, away from the inflexible schedules classes, would be the ideal profile of the students who could perform this type of course. And, points to attitude as a possible predictor of student success in this environment.

1. Introduction

Major corporations and institutions responsible for professional training of Merchant Marine are rapidly developing Degree and Postgraduate programs in the virtual world of the Internet, that allow students Nautical Schools reconcile their academic studies with their professional skills.

The Superior Officer Training Merchant Marine in Spain has always been twofold, academic and professional. It is our duty to seek a balance between both aspects.

The first wave of courses was well received mainly by students limited by distance, work and life commitments to continue their studies. Most students in this category saw the possibilities of finishing their college degree or mandated professional training as the end that justified the means without truly assessing the prerequisites they needed to have to successfully "attend" classes in cyberspace, nor quite understanding the differences between the face-to-face courses and this new non-traditional approach to classes.

A couple of years after the newness of the concept wore off, educators, administrators and even students are starting to ask the right questions; how convenient, feasible and truly adequate is distance learning? Are online courses meeting the academic standards of the institution OMI? But even more importantly, in a perfectly designed and implemented online course, are all students equally able to successfully complete, enjoy and even thrive in this new course environment? This article presents the findings of a study that help answer some of these questions.

2. Development

2.1. Background

The Internet provides a viable medium for the delivery of course, curriculum to students and workers in need of contin-

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uing education or dated training that will keep them current in this competitive job market of the Marine Merchant. Internet's lower connection costs, faster speeds and higher data transfer rates, make textual and multimedia course content, delivery viable and accessible to more people than ever before. According to the Pew Research Center, 73% of American adults use a computer and of these 128 million use the Internet and the numbers are steadily increasing. In Spain, according to the new report '*Youth Portraits*' series, the Cabinet of Sociological Research of the Basque Government, regarding the use of youth to the media, 96 percent of young people use the Internet, the most daily and mainly for entertainment and training.

Distance education, as defined by the National Center for Education Statistics (NCES) (U.S. Department of Education, 2001), is instruction or training courses delivered to remote (off-campus) sites via audio, video (live or pre-recorded), or computer technologies, including both synchronous (simultaneous) and asynchronous (not simultaneous or delayed) instruction. And the Higher Education Act defines distance education as an educational process where the student is separated in time or place from the instructor. During the 2010-2011 academic year 56% of all 2 and 4 year degree-granting institutions offered distance courses.

And among these institutions, 90% offered asynchronous web-based courses. Furthermore, of these institutions and others planning to offer distance courses within the next 3 years, at least 88% are planning on increasing and/or offering for the first time asynchronous web-based courses as the primary mode for their distance education courses.

Distance education courses with hybrid modalities of content delivery are rapidly being developed at universities all over the world. Course content in textual and multimedia format can now be organized, stored and delivered over the Internet either: 1) synchronously – trainees/students and educators "meeting" in cyberspace at a pre-arranged time; 2) asynchronously – pre-recorded lecture videos and other materials being accessed at a time more convenient to the student; or, 3) hybrid – a mixture of synchronous and asynchronous delivery of text and multimedia where some of the lectures are delivered "live" and others "pre-recorded". Still, basic communication tools and other text media within all these online environments maintain their same synchronous "feel" in the chat-rooms and asynchronous "feel" in the bulletin boards, email, course notes, tests, and handouts.

Currently one of the biggest challenges educators and institutions face is determining the appropriate design and development of effective online courses. No data exists to unequivocally support the assumption that online courses are more effective than face-to-face instruction, nor that both environments are as effective. Still, the assumption that both environments are as effective is generally accepted as so (Wilson & Hood, 2000).

Given the lack of supporting data we set out to determine student characteristics and factors that could help determine and even predict students' preferred classroom environment between the face-to-face in the classroom, the web-based classroom environment classroom environment. Our study did not find any predictors in the demographics collected from the students but did find that attitude may yet be the key factor when predicting a student's preferred classroom environment.

2.2. Use of simulators in the training of Merchant Marine

The Spanish and international legislation on simulators and their use in the postgraduate training of Merchant Marine professionals is scarce and doing a brief review of the citations in the last ten years, we found only thirty references.

The FOM/1415/2003 order, in its Article 2.4.4., Relates the use of simulators and its reference to the International Convention on the International Maritime Organization STCW training and watchkeeping, in particular paragraph and AI/12 regarding trainers refers to paragraph AI / 6. Rule I/12 indicated the use of simulators for mandatory training of officers in the Merchant Navy simulator and the evaluation and demonstration of continued proficiency and simulator required by STCW code.

The Spanish law regulates, by Article 23 of RD 973/2009 of 12 June, the professional qualifications of the Merchant Marine, which states that to obtain them will need to pass a specific test of professional competence shall come well established for the exercise aboard the privileges of the regulating professional titles cited RD. The Spanish law regulates, by Article 23 of RD 973/2009 of 12 June, the professional qualifications of the Merchant Marine, which states that to obtain them will need to pass a specific test of professional competence shall come well established for the exercise aboard the privileges of the regulating professional titles cited RD. These tests of professional competence is limited to verify the exact and complete knowledge of the competences set out in Tables II / 1 and II / 2, III / 1 and III / 2 and watchkeeping standards contained in Chapter VIII the STCW Convention and the STCW Code, and ascertaining, through simulators of navigation, engineroom or SMSS, that the candidate provides the appropriate response to various situations that may arise in the course of watchkeeping.

The application of simulators in training graduate Merchant Marine, tries to mimic the behavior of a complex system or changes to certain stimuli. Therefore, currently this imitation of the real system is usually performed through digital simulation. Thus, we can define simulation as the technical development and implementation of a model of a real system to study their behavior, without breaking into the environment of the real system, namely simulation is the discipline of designing a model a real system, the implementation of that model, usually on a computer and analyzing the output produced during execution. A simulator is just the computer that simulates the system.

The concept of digital simulation and simulation capabilities have evolved in recent years in step with the evolution of both software and hardware of computers.

Regardless of the Spanish and international standards, simulation is essential because unless experimentation with a real system, simulation is the only way available to the Merchant

Marine Officer for the analysis of different complex systems with arbitrary conduct, where analytical techniques do not provide solutions.

Both in Nautical Engineering (Deck Officer) and the Marine Engineering (Officer Machines) simulation allows us to answer questions like What if? (Science: application of a direct problem) and what do I get? (engineering: application of an inverse problem), anticipating the behavior of the system under different situations, evaluation of performance and especially experience under conditions of operation, repair and maintenance that could be dangerous or high economic, social and environmental costs in the real system.

The usefulness of simulation in studying graduate of the Merchant Marine is useful because the real system can be dangerous, can be hardly available, the time constants of the system are not compatible with the professional. Simulation allows us to accelerate or retard the experiments as it suits us. It also allows us to access all the variables of the model and manipulate the model out of range safely.

Traditionally, simulation has been used in the design or improvement of systems and education, expanding and updating the knowledge of the system. In this case it has been used as a training room staff process control in nuclear power plants, thermal, petrochemical, paper, planes, bulldozers and of course as training complex systems of merchant ships: navigation, maneuvering, engine rooms, cargo handling, inert tank, and fire safety.

Thanks to simulation programs, students can not only receive knowledge passively, but above all, interact with models. For graduate studies and postgraduate Merchant Marine, we have commented that it seems clear that we must find a balance between the educational achievement of all media assets available in any medium and the use of materials of different nature, and the use of classroom virtual and conventional classroom learning, in one case as in the other, under the direction, guidance and expert teaching professionals and Merchant Marine supervision. In this project we considered that this balance to be maintained in graduate studies is not ideal to meet a professional postgraduate studies in the Merchant Marine way.

3. Methodology

This study was conducted on the students enrolled in a course at the Nautical School of the University of La Laguna. The course is taught over the Internet through a password protected site designed using Moodle platform (also known Learning Management System). Although students have the choice of meeting on campus 3 times during the semester for question-answer sessions, students still have to rely completely on the materials posted on-line to listen and view the professor's lectures and to complete the course requirements. For purposes of this study, the course is being taught completely as an Asynchronous Online Course.

In this study, data has been gathered for the past 3 long semesters, through surveys given to students at the end of every semester. All students in this study were enrolled in the same course with the same professors, the same class format and the same technologies. The professors have consistently received high marks in student evaluations for the past 10 years and are very highly regarded within the department. Careful planning went into minimizing the effects of "environmental" variables such as teaching quality, course being taught, and methodology, to ensure that the study results would be meaningful.

Semester after semester, students were given the same surveys to find out not only demography information, but also information on their learning styles, personality type, experience and attitude towards technology, and class format preference. Because of problems with missing data and invalid data being entered in the surveys, the study was extended past the initially intended semester.

With every semester new ideas were implemented to make the surveys more reliable. First, the paper-based surveys were converted to electronic format, posted online and directly connected to a database at a school website to minimize human error in the data tabulation process. The following semester, JavaScript code was added to key fields in the surveys (id, sex, age, computer experience and class format preference) to ensure a minimum of fields were filled before the surveys were submitted, and that crucial fields like id were available to link data collected in all 4 surveys.

Finally, in a subsequent semester, JavaScript code was added to all surveys' fields as the missing data problem was making other results highly unreliable. The whole site, where surveys were posted, was also made password protected to ensure only students enrolled in the course under study were able to access the surveys. After 3 semesters enough complete records were gathered to ensure reliable results would be reported.

The attitude towards technology (TAT) was measured using a modified version of Christensen's (1997) 10 paired-semantic differential items in 9 different areas of technology or subjects (computers, using computers for my professional productivity, using the World Wide Web, electronic mail, streaming video, V-Tel classes (All-In-One Telepresence Systems for Business and Education), on-line asynchronous classes, on-line synchronous classes, on-campus classes). Although the semantic scales were grammatically the same and also arranged the same as first designed, the topics were adapted to fit the needs of the researcher in the context of this study. From each attitude scale a single measure was created by computing the vertical mean response across the 10 pairs of semantic items for each subject. Cronbach Alphas computed on each measure ranged from 0.9228 to 0.9798 indicating reliable construct according to DeVellis (1991) proposed reliability guidelines for research instrument scales, and therefore legitimate to use these scales as predictors and measurements.

4. Population

The graduate level course under study enrolls an average of 30 students every semester. At this point of the study a total of 96 complete records from 96 students have been collected, over a period of 3 long semesters. All 96 students have been admit-

ted to a graduate level program. 21 students are in a PhD program, 14 are in a Master's program and 61 is in a professional certification program. Students' age ranges from 22 years old to 56. They live anywhere between 1-2 miles to campus (live on city of the campus) to up to 60 miles from campus. There are 74 males and 22 females. 47 students work part-time and 49 full-time. Of the 96, 41 are part-time students and 55 are full-time students. 69 students are single and 27 are married. Of the 96 students, only 24 students reported having children still living at home. As far as dependents (elderly parents and/or children and excluding self or spouse), 50 students reported no dependents living at home, 16 reported 1 dependent, 17 reported 2 dependents, 7 reported 3 dependents and 3 reported having 4 dependents at home. Overall, for class format method: 60 students preferred the face-to-face in class format method, 30 students chose the online asynchronous class format as their preferred method, 5 students chose V-Tel and only 1 student chose the synchronous class format (after experiencing the environment very briefly in the semester).

5. Results

In this study, the measures created from each attitude scale were used to classify subjects as to their choice of preferred class instruction method between the face-to-face traditional class format (TF) and the asynchronous online class format (AF). An ANOVA (ANalysis Of VAriance) was performed on each measure to determine whether there was a difference in the mean of the measure on those subjects preferring TF and on those preferring AF. Three measures V-Tel classes (VT), online asynchronous classes (OAC), and on-campus classes (OCC) had significant ANOVA F-tests. These three measures were then used as independent variables in a discriminant analysis to predict preference between TF and AF. The analysis yielded a significant (Wilks' Lambda=0.547, p=0.000) canonical discriminant function:

$$f(x) = (0.343 \times VT)+(0.918 \times OAC)+(0.605 \times OCC)+0.150$$

The function was evaluated at the mean values of each of the independent variables, yielding the group centroids of –0.693 for AF and 1.163 for TF. These centroids were then averaged to produce the cut point, C=0.235, used in the classification process. If f(x)>C, then the subject was classified into TF as the preferred class format and if f(x)<C, the subject was classified into AF as the preferred class format. The discriminant function classified the subjects correctly 86.7% of the time.

6. Future works

Regarding at the Student Motivators, additional data collected will be used to test the validity of this discriminant function as a useful instrument for classifying subjects as to their preference in class format depending on their response to attitude measures. The function will also be refined using the additional data. Also, the authors will continue to explore other types of measures, which may prove useful in classifying subjects as to their class format preferences.

With further testing and data collection, shipping companies, business and institutions both higher education and Marine Merchant may use this function as a predictor to help choose the "right" employees and subjects who would benefit from the web-based training as opposed to the face-to-face training.

7. Conclusions

— Training in Merchant Navy graduate is largely governed by international law, so it is essential to find a balance between academic and working life of the marine.
— The variety and number of complex systems that exist in the different types of ships making training simulators indispensable, as the merchant marine graduate will not be able to access all the scenarios that can offer such a simulation.
— Student motivation versus asynchronous online course format is superior to traditional education.
— When assessing professional competence of graduate of the Merchant Marine simulators requires compatibility professional practices on board ships such training simulation. We propose that the best way are asynchronous web-based courses.

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