Association for Information Systems
AIS Electronic Library (AISeL)

ACIS 2009 Proceedings

Australasian (ACIS)

12-2009

Does Technology Improve Education? A Distance Learning Perspective

Jane Myburgh
The University of Auckland, jmyburgh@auckland.ac.nz

Benjamin Smith
The University of Auckland, bsmith1@auckland.ac.nz

Does Technology Improve Education? A Distance Learning Perspective

Jane Myburgh
jmyburgh@auckland.ac.nz

Benjamin Smith
bsmith1@ auckland.ac.nz

The University of Auckland
Private Bag 92019
Auckland 1142
New Zealand

Abstract

Most universities today address technology challenges in some way or other in their curricula. This paper explores a project undertaken by a university business school incorporating a learning technology model. In particular, it reports on the pedagogical effectiveness of a simulation game employed for this method and carried out by students. Students were given the opportunity to develop their analytical, decision-making and group work skills. Based on feedback from participants, we conclude that the group project facilitated teaching and learning in a virtual environment was more engaged and interested in the material than the group following traditional face-to-face learning methods.

Keywords:

Distance Learning, Education, Games

INTRODUCTION

The use of technology-driven method in the classroom is becoming very popular with students. Today, most university degrees in business or technology address technology in some way or other in their curricula. Given the dynamic nature of the content, continuously evolving business models and applications, technological and managerial challenges in technology transformation, ever-expanding knowledge in the interacting disciplines and, importantly, its multi-disciplinary focus, it is a challenge for business schools to design and redesign technology-driven courses that are relevant, 'current' and pedagogically effective. This paper discusses a model of technology-driven course curriculum and reports on its effectiveness. The first part of the paper gives a detailed review of the literature and provides a background to the development initiatives from a business school perspective. It then describes a specific course, namely, a simulation game course, and its features, and presents a summary of the approach adopted in evaluating this method. The final section presents an analysis and findings of the empirical study and discusses its implications. We examine the application of technology in a game environment. We specifically interested in examining the technological issues related to the learning experience. Our focus is technology in the game and the learning experience. Organized in six sections, the next section explores technology education and games. Then we present different learning models we follow in this paper. Next, we state the methodology. We then present our results. Finally, we discuss the results, draw some conclusions and suggest recommendations for future study.

LITERATURE REVIEW

Distance Learning

Distance learning (DL) is an innovative method that uses technology to enhance learning. It is usually being used remotely where the learner and the instructor are not present at the same place (Verduin & Clark, 1991). Many studies tried to examine the effects of technology learning. Those effects take place in universities; naturally, they impact the students who take the course or courses using technology learning; technology learning also impact the instruction method, as the students are not present in a classroom, the instruction method must be modified. The reader is referred to several review papers that were published in this area. For example, see Schlosser and Anderson (1994), Moore and Thompson (1997) and Lesh and Rampp (2000). Some studies show that students consider the technology learning method as superior to the traditional teaching methods and therefore, it bears several benefits for the students as it enhances the learning experience (for example, see Boucher et al., 1999).

DL allows learning to be self-paced rather than instructor-paced (Kosmahl, 1994; Stephens & Doherty, 1992). Usually, studies that explored DL showed that DL produce higher learning outcomes compared to traditional methods, and usually these outcomes come at lower costs to both the students and the institutions using the method (Russell, 1999; Clark, 1999). Other studies, on the other hand, found that DL gave the students a sense of empowerment but the remote environments were judged "less rich" than those experienced by those taught in locally-controlled environments (Webster & Hackley, 1997). Griffin et al. (1999) noted that sometimes students presented negative attitudes toward DL; this was associated with the technology being used and the students' inability to deal with it. Following those contrasting studies, this research examines the learning outcomes of DL while employing a theoretical model and compares between the DL approach and the face-to-face teaching method.

Business Simulation Games and the Learning Experience

A business simulation game offers students the opportunity to learn by doing in as authentic a management situation as possible, to engage them in a simulated experience of the real world and to produce experiential learning experiences (e.g., Garris et al., 2002; Kolodner, 2003; Martin, 2000). Business games and simulations related to the Information Systems field have been studied both in academia and industry (e.g., Asakawa and Gilbert, 2003; Ben-Zvi, 2006; Dasgupta, 2003; Dickinson et al., 2004; Dickson et al., 1977; Michaelson et al., 2001). Wolfe and Crookall (1998) even assessed the state of simulation and gaming as a scientific discipline. Erkut, 2000 states that games provide several advantages when used in a DL context.

Business games and simulations also present an experiential learning experience. That is, they emphasize the interaction between experience and learning by exploiting the subjective nature of the learning process (Kolb, 1984) and creating a transformation of experience that engenders knowledge (Mainemelis et al., 2002). Business games relate to experiential learning as they present a method that epitomizes experiential learning (Garris et al., 2002). They provide students the opportunity to become intimately involved in decisions faced by executives in real organizations, to test the understanding of theory, to connect theory with application, and to develop theoretical insights (Ben-Zvi and Carton, 2007).

A well known framework that models learning experiences is the Revised Taxonomy of Educational Objectives developed by Anderson and Krathwohl (2001). This model typifies the relationship between experiential learning and business games. The Revised Taxonomy of Educational Objectives is a modified version of Bloom's Taxonomy of Educational Objectives (1956). The Taxonomy represents an effort to standardize the language of intellectual learning behavior. The taxonomy's knowledge dimension represents a continuum from concreteness to abstraction and includes four knowledge types: factual, conceptual, procedural, and meta-cognitive. Concrete, factual knowledge includes the introductory concepts, skills and details of a specific discipline. Conceptual knowledge represents a synthesis of factual knowledge and movement towards an understanding of principles and theories associated with a given discipline. Procedural knowledge involves one's grasp of how to study something. This may include knowledge of subject-specific techniques and methods or informed judgments for determining when to use appropriate procedures. Meta-cognitive knowledge is summarizing knowledge; theoretical and conceptual knowledge that synthesizes the lesser dimensions.

This framework represents a practical heuristic for exploring the interplay between teaching, learning, assessment and business games. Thus, we discuss the learning experience using a specific business game course.

HYPOTHESES

This study follows the Revised Bloom's taxonomy and makes a comparison of the learning experiences between DL and traditionally-taught classes. We employ the Revised Bloom's taxonomy elements as variables. The study's first hypothesis tests whether learning outcomes experienced by DL students were equal or superior to those experienced by traditionally-taught students. This hypothesis is based on the general finding that DL students do at least as good as other students (Boucher et al., 1999; LaRose et al., 1998). The learning experiences will be tested against each of the elements of the Revised Taxonomy of Educational Objectives.

Hypothesis 1. Students playing the business game through DL will demonstrate learning levels that are equal to, or higher than, those achieved by the traditionally-taught students.

One of the benefits supposedly associated with web-based education is its ability to give students a sense of control and self-direction over the course of their curriculum. This control allows the students to plan their own study times and pace their learning based on their own needs and thus allowing for greater pedagogical flexibility (Hazari & Schnorr, 1999; Kosmahl, 1994; Webster & Hackley, 1997). Therefore, the study's second hypothesis is:

Hypothesis 2: Students playing the business game through DL will express higher levels of control over their learning experience.

Another benefit attributed to the DL approach is student satisfaction from the instructor. Studies have shown that students taking the DL approach are more satisfied with the role of instructor in the course (see, for example, Gagne & Briggs, 1992; Kosmahl, 1994). Thus, the following hypothesis deals with the students' level of satisfaction:

Hypothesis 3: Students playing the business game through DL will express higher levels of satisfaction with the instructor's role in the course.

In addition to satisfaction from the role of the instructor, he or she should also provide useful feedback to the students (Hazari & Schnorr, 1999). Studies exploring feedback techniques suggest that students or players usually prefer face-to-face feedback over impersonal feedback provided by emails or other web methods (Andrusyszyn et al., 1999; Cragg et al., 1999). Accordingly the next hypothesis is:

Hypothesis 4: Students playing the business game through DL will express lower levels of satisfaction with the quality of feedback received from the distant game instructor.

The last hypothesis deals with the technical problems and the technical support when using DL. Burns (1998) and Griffin et al. (1999) have noted that many technical problems accompany DL's use. It is possible that these problems present a damaging intrusion rather than an aid to learning and that high technical support at the local level is necessary to insure a satisfying experience. Therefore, we state his hypothesis as follows:

Hypothesis 5: Students playing the game under high support conditions will have fewer interface problems.

METHODOLOGY

The need for curricula to be up-to-date with the knowledge of current practices, business models and applications is well recognized in the current dynamic environment. Responding to the challenge of meeting the ever moving target of 'being current' and 'relevant', academic institutions are involved in an on-going curriculum development effort. Developing and teaching a current and relevant curriculum is challenging and stimulating because of the topic's rapid evolution and its interfacing effect on every aspect of business. The dot com crash in 2001 undermined some of the foundational premises on which technology is taught in business schools. For example, the electronic marketplaces and application service providers (ASPs) that were predicted to create multi-billion dollar markets by 2004, rapidly faded out as several firms went out of business. Also, in Australia, the number of electronic marketplaces has declined significantly from around 150 in 2001 to less than three in 2006.

It is challenging to keep up-to-date and be on top of the changing nature of technology applications, teaching materials and the introduction and occasional disappearance of some new and interesting business models, software applications and environmental conditions. Because of the ever-changing nature of course content and case studies, it is very hard to develop a course that is stable on some theory and applications, and has some longevity. It is possible that a certain course which was considered successful in 2005 may be viewed as a significant failure by 2010. For example, an established brick-and-mortar retailer in Australia has acquired its strong online competitor, a successful online retailer of green groceries and simply merged it with its existing fledgling online retailing unit. With these dynamic changes occurring regularly, it is difficult to maintain a set of local case studies and examples and present them for analysis in the class. Taking into consideration these dynamic changes, simulation courses may simply consist of some interesting overseas case studies of successes and failures, and an explanation of current applications. Such courses simply lack the sufficient depth in content and process, and do not equip students with the conceptual frameworks and critical skills necessary to deal with the changing technology and business models in the workplace.

Rapid changes in the field make course development and maintenance extremely resource intensive. In addition to keeping abreast of the evolving and changing content, academic staff teaching these courses must also continuously learn constantly evolving software applications, hardware and networks. To be effective across the broader curriculum, teaching simulations requires bringing together a wide variety of skills from a number of academic disciplines. Because of its multi-disciplinary nature, simulations also include some traditional content from other disciplines such as finance, accounting and logistics. This requirement creates a need to integrate the offerings and content across different courses taught in the business schools.

The difficulties of delivering an effective and relevant course may be exacerbated if the classes are small. With increasing number of electives to choose from, this is often the case in many business schools. This together with the recent down turn of the demand for information technology/system based courses in general in many universities; the class sizes have typically become smaller. While small classes facilitate critical analysis of case studies and critical appraisal of the latest frameworks and technology, and learning by sharing and interacting, lecture-based teaching typical in large classes is considered inappropriate for such a subject.

Table 1. Demographic Statistics for the Two Investigated Groups

Variable	DL Group (n=98)	Traditionally-Taught Group (n=115)
Mean Age	31.2	32.0
Mean GPA	3.47	3.39
% of Female	31	38

HYPOTHESIS TEST RESULTS

This section presents the results of the questionnaire. In the next section we analyse the results and conduct a discussion.

The first four questions of the questionnaire refer to the first hypothesis, testing the course-related learning effects associated with DL versus traditional teaching methods. They represent the different knowledge levels of the Revised Taxonomy of Educational Objectives. We present the main results in Table 2. Our findings show that the DL group learning levels were equal to, but not significantly superior to those obtained by the other group (the Z values were low and the p-value were higher than the 5% significance level).

In addition to the subjective measurements, we also consider two objective ones: quiz results and company performance. Each semester the students were tested by a quiz. The quiz measured the students’ command of rules and general information about the game, and thus it relates to factual knowledge. Company performance, which was measured by the total profits each group accumulated during the game, serves as an indicator to integrated conceptual and procedural knowledge at the highest level. Therefore, it may be considered as an objective measurement for meta-cognitive knowledge. The findings are presented in Table 3. Consistent with the subjective measurements, the results show that the DL group learning levels were very close and not significantly different than those obtained by the other group. Thus, hypothesis 1 was accepted.

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

Variable	DL Group		Traditional-Taught Group		Z	p-value
	Mean	S.D.	Mean	S.D.		
Factual Knowledge	5.12	0.67	5.02	0.56	1.14	0.2549
Conceptual Knowledge	5.22	0.45	5.12	0.58	1.39	0.1646
Procedural	5.43	0.86	5.19	0.89	1.95	0.0509

Knowledge						
Meta-Cognitive Knowledge	5.01	0.85	4.89	0.82	1.02	0.3083

Table 3. Means, Standard Deviations (S.D.), Z values and p-values of the Quiz and Company Performance for the DL and Traditional-Taught Groups.

Measurement	DL Group		Traditional-Taught Group		Z	p-value
	Mean	S.D.	Mean	S.D.		
Quiz Results	78.5/100	11.2	82.3/100	10.8	1.72	0.1021
Company Performance (Accumulated Profits)	16,480	8,845	17,123	9,845	1.12	0.2846

The second hypothesis stated that DL players would feel they had greater control over the learning experience. This hypothesis was not confirmed, as the DL group did not present greater control (5.55 compared to 5.62 with 0.4421 as the significance level). The study's third hypothesis evaluating student satisfaction from the instructor was also rejected due to similarity in the results (5.12 compared to 5.07 with 0.6238 as the significance level). Both results along with the statistical tests are presented in Table 4.

Table 4. Means and Standard Deviations (S.D.), Z values and p-values of Responses for the DL and Traditional-Taught Groups.

Variable	DL Group		Traditional-Taught Group		Z	p-value
	Mean	S.D.	Mean	S.D.		
Greater Control	5.55	0.68	5.62	0.62	0.76	0.4421
Satisfaction with the instructor	5.12	0.75	5.07	0.69	0.49	0.6238
Satisfaction with the feedback	5.26	0.43	5.32	0.51	0.89	0.3710
Experiencing problems	5.86	0.58	4.59	0.42	17.49	<0.0001

Hypothesis four dealt with the perceived quality of the feedback players received from the simulation and the instructor. The results, illustrated in Table 4, show that both groups rated the quality of the game's feedback approximately the same (5.26 compared to 5.32). Thus, this hypothesis was rejected.

The final hypothesis dealt with the additional technical burden placed on DL players, due to the fact that they had to interface through the internet, and how that affected their playing behaviors and the nature of the communications conducted between players and the game instructor. Based on the information presented in Table 4, it can be concluded that timeliness was not achieved and that internet-use problems, rather than learning coaching, dominated player communications for the DL group. The results present a significant difference between the two groups. We discuss those differences in the next section.

DISCUSSION AND CONCLUSIONS

Much has been published on the special learning environment created through the use of DL education. Despite this assertion of uniqueness**,** this study's subjects usually rated their DL situation no better or worse than their traditionally-taught counterparts despite the fact that their interactions with the simulation, and their access to information and coaching were completely different from those of the other group. We also found that numerous problems arose which could have materially mitigated DL's supposed virtues. These problems mainly related to internet operating skills the administrative load placed on the instructor.

Our investigation reveals that timeliness was not achieved in the DL application as it took from at least 5 hours to more than two days on one occasion to return the results to the students (due to technical problems). The average turnaround time over the simulation's competition amounted to almost 14 hours. Only in one instance results were turned back about an hour early. Regardless of how long it took players to submit their decision sets or readable files, the instructor's response time was the same across both groups. The reports were completed and transmitted to all companies within about 5½ hours after a game run had been made. Based on this performance it must be concluded that the goal of timeliness or speedy turnaround times was not obtained using DL.

We conjecture that those results are not necessarily unique to the university nor do they represent a poor software choice. We believe that DL still faces several challenges and creating timeliness is one of them. Future research can compare DL experiences using different software in different schools.

The volume of communication traffic was higher for DL students. This amounted to 13.8 messages per company that were not dispersed evenly over the game's run. Message content was also different: most of the DL communications dealt with problems associated with the mechanics of working with sending, recording and retrieving files, apologizing for late decisions, improperly recording their decisions, etc. The traditionally-taught students had very few problems in this area and communicated most-often regarding the simulation's teaching components such as asking for judgments about contemplated decisions.

This study's results make it possible to draw a number of conclusions about DL instruction using business games while also suggesting a number of areas for future research. Although DL is not associated with lower learning results, it did not realize its many theorized benefits. Its only benefit was one of relieving the instructor of game-processing chores. It also appears that DL, or the simulation used in this study, is very robust. Despite the many problems the players had with sending and receiving their results, and the extra hours they spent because of this, their overall reactions to the experience were the same as those of the other group. In Table 5 we summarize the course evaluation by the players. Those results were obtained using common course evaluation forms used in many universities world-wide. It seems that the overall course evaluation got higher ratings with the DL group, although still within the same range.

We also point out that the game used in this study, as is the case with most other top management games, was an interactive market simulation and accordingly entailed batch processing. This meant turnaround speeds were determined by the swiftness at which the slowest team in the industry submitted a usable decision input which robbed the DL situation of its often-cited self-paced learning.

In the traditionally-taught group the use of the game produced relatively weaker relationships between game play and course-related learning. For the DL group, it appears the game was an important factor in the learning equation. However, an important insight is that if students do not possess computer fluency, strong technical assistance must be provided. This leads us to highlight the role the instructor plays in creating an optimal learning environment as well as indicating how different approaches to teaching the same material may bring about different learning results.

Table 5. Means and Standard Deviations (S.D.) of Responses for the DL and Traditional-Taught Groups.

Variable	DL Group		Traditional-Taught Groups	
	Mean	S.D.	Mean	S.D.
Course Evaluation	5.35	0.68	5.12	0.43
Simulation Evaluation	4.95	0.79	5.10	0.51

We note that we have not studied the role of within-team variances in player aptitude, academic achievement and game technical knowledge, as we leave that for future research. The role of team cohesion as a precursor of high game performance has been cited and studied in the business game literature (Wolfe et al, 2002). An element in a firm's cohesion is the degree of homogeneity or similarity that can be found amongst its members. Thus, it would be ideal for team members to have a high average level of game technical knowledge; yet, this level of knowledge should to be high at the individual level so that they could all be more-equal decision making partners. This is usually the case for DL groups, where team standard deviations in work experience, academic achievement and game technical knowledge are significantly correlated. We suggest an extensive study of this topic, as well as other learning effects produced by games and simulations. Research into the advantages and disadvantages of this type of learning is clearly warranted as DL becomes more and more popular in education.

REFERENCES

Anderson, L.W., Krathwohl, D.R., (Eds.) A Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. New York, NY: Longman, Inc, 2001.

Andrusyszyn, M.A., van Soeren, M, Laschinger, H.S., Goldenberg, D., & DiCenso, A. "Evaluation of distance education delivery methods for a primary care nurse practitioner program". Journal of Distance Education, (14:1), 1999, pp. 14-33.

Asakawa, T. and Gilbert, N. "Synthesizing Experiences: Lessons to be Learned from Internet-mediated Simulation Games." Simulation & Gaming: An Interdisciplinary Journal, (34:1), 2003, pp. 10-22.

Ben-Zvi T., "Business Games as a Tool for Teaching DSS", proceedings of the Pre-ICIS AIS SIG-ED IAIM International Conference, 2006.

Ben-Zvi T. and Carton, T.C., "Business Games as Pedagogical Tools", Proceedings of the Portland International Center for Management of Engineering Technology (PICMET) Conference, 2007.

Bloom, B.S. (Ed.) Taxonomy of Educational Objectives. New York, NY: David McKay Company, Inc., 1956.

Boucher, B., Hunter, D., and Henry, J. "The effectiveness of computer-assisted instruction in teaching biomechanics of the temporomandibular joint", Journal of Physical Therapy Education, (13:2), 1999, pp. 47-51.

Burns, A.C. "A neophyte distance educator's experience". In J.K. Butler, Jr., Leonard, N.H., & S.W. Morgan (Eds.), Developments in Business Simulation and Experiential Learning, (25), 1998, pp. 138-144.

CAPSTONE Northfield, IL: Management Simulations, Inc., 2000

Clark, R.E. "Bloodletting, media and learning", in T.L. Russell, The No Significant Difference Phenomenon, pp. 8-11. Raleigh: Office of Instructional Telecommunications, North Carolina State University, 1999.

Cragg, C.E., Andrusyszyn, M.A., and Humbert, J. "Experience with technology and preferences for distance education delivery methods in a nurse practitioner program". Journal of Distance Education, (14:1), 1999, pp. 1-13.

Dasgupta, S. "The Role of Controlled and Dynamic Process Environments in Group Decision Making: An Exploratory Study." Simulation and Gaming: An Interdisciplinary Journal, (34:1), 2003, pp. 54-68.

Dickinson, J.R., Gentry, J. W. and Burns, A. C. "A Seminal Inventory of Basic Research Using Business Simulation Games." Proceedings of ABSEL, Developments in Business Simulation and Experiential Learning Conference, Las Vegas, 2004

Dickson G.W., Senn, J.A., and Chervany, N.L. "Research in Management Information Systems: The Minnesota Experiments." Management Science, (23:9), 1977, pp. 913-923.

Erkut, E. "Editorial," INFORMS Transactions on Education, (1:1), 2000.

Gagne, R.M., Briggs, L.J., and Wager, W.W. Principles of instructional design. NY: HBJ College & School Division, 1992.

Garris, R., Ahlers, R., and Driskell, J.E. "Games, Motivation and Learning: A Research and Practice Model", Simulation & Gaming: An Interdisciplinary Journal, (33:4), 2002, pp. 441-467.

Griffin, R.B., Joyner, E.R., Schmidt, T. Mansfield, K., and Tuck, L. "A day in the life of an interactive, real time, internet delivered course: A demonstration", Developments in Business Simulation and Experiential Learning, (27), 1999, pp. 346-347.

Hazari, S., and Schnorr, D. "Leveraging student feedback to improve teaching in web based course", The Health Education Journal, (26:11), 1999.

Kolb, D.A. *Experiential Learning: Experience as the Source of Learning and Development.* Englewood Cliffs, NJ: Prentice Hall, 1984.

Kolodner, J.L., Gray, J. and Fasse, B.B. "Promoting Transfer through Case-Based Reasoning: Rituals and practices in learning by design classrooms", Cognitive Science Quarterly, (3:2), 2003, pp. 183-232.

Kosmahl, E.M. "Instructional use of computers for entry-level physical therapy education", Journal of Physical Therapy Education, (8:1): 25-31, 1994.

LaRose, R., Gregg, J., and Eastin, M. "Audiographic telecourses for the web: An experiment", Journal of Computer-Mediated Communication. (4:2), 1998.

Lesh, S.G., & Rampp, L.C. Effectiveness of Computer-Based Educational Technology in Distance Learning: A Review of the Literature. Columbia: University of Missouri. (ERIC Document Reproduction Service No. ED 440 628), 2000.

Mainemelis, C., Boyatzis, R.E., and Kolb, D.A. "Learning Styles and Adaptive Flexibility: Testing Experiential Learning Theory", Management Learning, (33:1), 2002, pp 5-33.

Martin, A. "The Design and Evolution of a Simulation/Game for Teaching Information Systems Development", Simulation & Gaming: An Interdisciplinary Journal, (31:4), 2000, pp. 445-463.

Michaelson, R., Helliar, C., Power, D., and Sinclair, D. "Evaluating FINESSE: a Case-Study in Group-Based CAL." Computers & Education, (37:1), 2001, pp. 67-80.

Moore, M.G., & Thompson, M.M. The effects of distance learning: A summary of the literature. Research Monograph No. 15. University Park, PA: American Center for the Study of Distance Education, The Pennsylvania State University, 1997.

Russell, T.L. The No Significance Difference Phenomenon. Raleigh: Office of Instructional Telecommunications, North Carolina State University, 1999.

Schlosser, C.A., & Anderson, M.L. Distance Education: A Review of the Literature. Ames, IA: Iowa Distance Education Alliance, Iowa State University, 1994.

Stephens, P.F., & Doherty, J.A. "The use of Apple Macintosh computers and Hypercard in teaching physiology laboratories", American Journal of Physiology, (263), 1992, pp. 23-28.

Verduin, J.R., & Clark, T.A. Distance Education: The Foundations of Effective Practice. San Francisco: Jossey-Bass Publishers, 1991.

Webster, J., & Hackley, P. "Teaching effectiveness in technology-mediated distance learning", Academy of Management Journal, (40:6), 1997, pp. 1282-1309.

Wolfe, J., and Crookall, D. "Developing a Scientific Knowledge of Simulation/Gaming." Simulation and Gaming: An International Journal, (29:1), 1998, pp. 7-19.

Wolfe, J., Flores, L. and Ritchie, W. "A Business Game Distance Education Application: Learning Outcomes and Experiences". Developments in Business Simulation and Experiential Learning, (29), 2002, pp. 287-302.

COPYRIGHT