

Article No.1

A RESEARCH PAPER ON VIRTUAL LEARNING ENVIRONMENT

Arvind Mahajan
Assistant Manager, HR(LPG)

Abstract: Information technology is revolutionizing the economic world structure. It is also providing new capabilities for online training and development which is required by the educated workforce. The presence of a virtual learning environment (VLE) can alter the dimensions of existing learning and the teaching/coaching relationships in a drastic way. This paper will explore how Institutes/Organizations and their students/ employees can benefit from appropriate use of technology in ways that help them learn in an environment which is more conducive as compared to the traditional methods of Face to Face Learning. The Paper highlights the potential pitfalls of using VLE. Further, it is explored as to whether the element of Collaboration is supported in VLE or not. The ultimate goal of VLE is to transfer knowledge gained in a virtual environment to an actual real-world setting. The paper discusses the need for assessment of VLE. On the basis of studies done in the past, there is a general and longstanding consensus that skills acquired in a virtual environment can be transferred to real situations and improve real-life task performance. However, the paper indicates that to ensure cognitive skills acquired in a VLE are transferable to the real world, training objectives need to be tied directly to realistic scenario events which in turn are directly linked to measures of specific required behaviors.

Keywords: Effectiveness, Virtual Learning Environment

Introduction

Have you ever thought about learning environments outside of the classroom which may be more effective than classroom teaching? We could think of sending the students/employees for few days to get practical insights about say a Car Manufacturing Unit. However, it is not practical for 60 students or young trainees of an Organization to travel 200 kms to the company's location. Moreover, the company may not be able to accommodate so many students. The other impediments to the aforesaid idea are cost, time frame or danger/risk involved. The solution lies in computer generated Virtual Learning Environments(VLE).

With the help of Virtual learning environment(VLE), a student/employee(referred to as student hereafter) can sit in front of the screen and attend meetings, read documents, operate equipment, access computers, or view an assembly line, all from the comfort of their Mobile/Tablet/Virtual Reality Device/Computer/Laptop. A Geology student could monitor equipment during Earthquake, a Biology student could study reproduction occurring live for any species, a Chemical Engineering student could understand the complete paint manufacturing process and experiment on various compositions of paints, a History student could revisit World War II, a Sociology student studying backward

classes could design social awareness programs, an Accounting student could conduct an audit of the balance sheet, a Finance student could reduce debt of a firm by selling noncore assets, an Industrial Relations student could negotiate a Trade Union settlement, an HR student can conduct live recruitment, a Marketing student could implement strategies to fetch a sales deal, or an Operations student could implement a Quality Circles at a plant. In all of the above examples, the student gets to know the context for the learning process to take place. Contextualizing content helps in making their concepts more concrete, thus facilitating understanding, recall, integration of knowledge and enhancing the application of the knowledge.

Stonebreaker and Hazeltine (2004) describes Virtual learning as the delivery of learning through electronic mediation that reduces the gap when the instructor and the learner are separated in either time or place. According to Wilson (1996), Virtual Learning Environments (VLEs) are 'computer-based environments that are relatively open systems, allowing interactions and encounters with other participants'. This definition widens the conventional understanding of the learning environment as it adds three more dimensions viz. interaction, technology and control (Piccoli, Ahmad and Ives, 2001). VLEs can support both blended and online (distance) learning i.e. VLE can be either used to provide lecture notes and presentations (before and after the actual face-to-face lectures), additional learning materials, assignments, feedbacks, useful web links, grades, discussion boards, and communication among students (and with tutors), among others (Halawi, Pires and McCarthy, 2009) or deliver the actual training sessions. VLEs are referred to as technology-mediated learning, web enhanced learning, web-based learning, and learning management systems in the literature.

Benefits of VLE

The following are some of the benefits of using VLE:

1. Improved Contact between Learner and Instructor

The use of VLE allows personal contact with the instructor through the use of specific software (e.g. Moodle, Blackboard, WebCT, CaMILE etc.). Group members can reflect on previous arguments and reply with a thought-out response. It also allows sufficient time for deliberation. McKeough (2009) suggested that online tutorials give learners more time to read the necessary texts in a flexible way. The frequency and quality of Feedback between instructors and learners is also increased.

2. Improved Flexibility

The issues owing to distance gap are ruled out as VLE permits learners to listen to the lectures, thereby removing the need to attend classes completely (Sawaan, 2006; Chattopadhyay and Sumrall, 2007). VLE improves the flexibility of working hours for both students and teachers, and help them manage their time more effectively. They can decide how and when to carry out their activities and

take greater control of their own learning outside class time (Potter and Johnston, 2006). Students get an option to combine study and pursue a part time employment and thus obtain the job experience necessary to enhance their Resume and develop their career.

3. Active Learning

The students become more actively involved as learners. Students are not only getting information but they also take an active part in the learning process. So, although a 'virtual experience' does not replace the efficacy of live learning experiences, the combination of media, including video, interactive and content constructed in a carefully considered environment, offers opportunities to improve the learning experiences for students in large cohorts (Stanley and Edwards, 2005). A student is able to look at information from multiple perspectives and various stakeholders' point of view. A VLE provides and engages the student through different activities like observation, thinking, listening, reading, acting, doing and it therefore caters to a wide range of student learning styles as compared to traditional learning methods. The students in VLE settings are usually self-directed which leads to development of goal-setting skills, persistence and self growth.

4. Participation Equalization Effect

In VLE settings, learners are empowered to post opinions simultaneously. In face-to-face communication, a student may want to make a contribution but may not participate due to power distance or any other implicit norm which regulates the conversation flow. Research suggests that groups interacting via computers have more equal participation among members than groups interacting face-to-face. Bonito J.A. & Hollingshead A.B. (1997) had shown that low-status members in face-to-face groups participated less and exerted less influence on group decisions than high-status members. The research reported that they tended to concede more to high-status individuals in discussions; care more about being accepted by high status individuals and conformed more to high status views. A large number of Researchers (Clapper D.L., McLean E.R., & Watson, R.T. (1991), Daly B. (1993), Dubrovsky, V.J., Kiesler S., & Sethna, B.N. (1991), George, J., Easton, G., Nunamaker, J., et al. (1990), Hiltz, S.R., Johnson, K., & Turoff, M. (1986), McLeod, P. L. (1992), Rice, R.E. (1984), Siegel, J., Dubrovsky, V., Kiesler, S., et al. (1986), Straus, S. (1996), Straus, S., & McGrath, J. E. (1994) reported that members of groups interacting using VLE participated more equally than groups interacting face-to-face. This finding has been called the participation equalization effect. The reduction of social cues in VLE settings that provide vital information regarding one's status in a group help students participate without any inhibition or fear.

5. The teaching/training costs can be reduced for Institutes/Organization, as the reduction in the number of key lectures decreases the costs of electricity,

maintenance and materials, among others (Lightner and Olson, 2001; Sawaan, 2006; Halawi, Pires and McCarthy, 2009).

6. The other benefits of VLEs in the literature include improving learners' achievements and attitudes towards learning (Hiltz, 1995; Maki et al., 2000) and improving learners' evaluation of their learning experience (Alavi, 1994). their learning experience (Alavi, 1994).

Potential Disadvantages of VLE

The use of VLE for can also lead to the following disadvantages:

1. Impersonal Relationship

Firstly, the teaching relationship between instructors and students can become impersonal since the contact is through the computer. Exposure to VLE tends to lead to learners' feelings of isolation due to the absence of 'elements of immediacy' such as eye contact, smiling and vocal expressions (Brown 1996; Handy, 2005), learners' feelings of frustration, anxiety and confusion (Hara and Kling, 2000) and learners' reduced interest in the subject matter (Maki et al., 2000). Various researches ((Reynolds, Rice and Uddin, 2007; Braeckman, Fieuw and Van Bogaert, 2008)) suggest that learners prefer a combination of face-to-face education and VLE. It has been suggested that an appropriate blended learning environment, combining virtual learning with new kinds of physical space, can restore the human moment in the educational process (Bleed, 2001).

2. Technical Problems

Secondly, the possibility of technical failures cannot be ruled out. This could be due to a software problem, hardware problem, networking problem or internet connectivity problem. In a research study conducted by Lightner and Olson (2001), students expressed concern that there were still cases of disrupted video or audio connections, and some students explicitly identified 'technical problems' as being a difficulty.

3. Passive Attitude

Thirdly, passive attitudes on the part of the learner can be encouraged. Students need to be motivated in order to increase their attention in the room, to ask questions of the teacher, to work in groups, and to learn effectively. Thus, students in VLE need to be self-directed and motivated and to display sufficient self-discipline. For this reason, many investigations consider students' participation and motivation as being an important factor for VLE success (Rao and Walsh, 2000; Love and Fry, 2006; Hussin, Bunyarit and Hussin, 2009).

4. Compulsory Learning Solution

In some situations, VLE can lead to an inadequate pedagogical structure, which will result in a compulsory learning situation. A compulsory learning situation occurs when a technology is designed to support a specific learning model that may not be congruent with the learner's epistemological beliefs about how learning should occur (Vermunt, 1998).

Virtual Learning Environment and Collaboration

Early research of 1980s and 1990s suggested that VLEs are open and democratic medium with a number of advantages over existing communication media for supporting collaboration. Marttunen and Laurinen (2001) suggest that online asynchronous discussion can facilitate argumentation skills because "these environments have been characterized as democratic and equal in nature." They report a study that showed argumentation skills can be facilitated by asynchronous discussions through computer.

Kirschner et al. discusses with respect to the (interaction) design of computer-supported collaborative learning environments. He stresses the need to afford the technical, educational and social aspects of such environments. Baltes, Dickenson, Sherman, Bauer, and LaGanke conducted a meta-analysis comparing decision making in VLE settings with face-to-face decision making and concluded that decision making in VLE setups is not superior to face-to-face decision making. However, they argue that steps can be taken to foster high levels of collaboration through VLE. They suggest that enhanced collaboration could be achieved through explicit statements about everyone's ideas being valued and specific sanctions against unconstructive criticisms of other's ideas. Guzdial and Turns in CaMILE introduced a number of activities which can be viewed as supporting the students' collaborative activities. However, they admit that the provision of these activities does not automatically lead to learning.

Therefore, we can infer that it has been assumed in the above studies that participants know how to collaborate effectively, and that providing them with the right tools will enable effective collaboration in VLE settings. If students do not know how to collaborate effectively, we need to develop these skills in order for them to use the tools productively.

Assessment of VLE

Womble (2008) emphasised the need for exploratory research efforts in order to determine the usefulness of VLE. This need is further emphasised by higher education institutions' gradual movement away from the information transfer mode towards a more student-centred learning focus (Potter and Johnston, 2006) that adopts a blended learning approach, a combination of traditional face-to-face teaching methods and VLE.

Gormley et al. (2009) stated that the effectiveness of VLE has been difficult to quantify and that there have been concerns that such educational activities may be driven more by novelty than pedagogical evidence. According to Gormley et al. (2009), it is necessary to reflect on this issue while identifying the strengths and weaknesses of this system for

possible future improvements. Along the same line of argument, Love and Fry (2006) stated that, if it is accepted that there is a need to incorporate new technologies into the classroom, virtual or otherwise, it is critical to consider their impact on the teaching-learning environment from the students' perspectives. According to Handy (2005, p. 18), 'when evaluating these new methods of presenting accounting concepts, accounting educators should consider instructional methods' impact on students' learning, as well as students' perception of their learning'.

Based on the views of a cross-section of MBA students and graduates at an American university, Drago et al. (2005) attempted to dispel some myths related to VLE and online education like student isolation, a high propensity to drop out, the difficulty of developing certain skills online, a lack of appropriate learning styles, and the lack of appropriate teaching styles. He concluded that the quality and effectiveness of VLE is similar if not higher than the traditional face-to-face system. Volery and Lord (2000) surveyed online management course students using the WebCT in an Australian university for studying the critical success factors in VLE. The study identified three factors – technology (ease of access and navigation), the instructor (competence and attitude), and students' previous experience of technology use – as being critical to the success of VLE. In addition the study concluded that 'the lecturer will continue to play a central role in VLE, albeit his or her role will become one of a learning catalyst and knowledge navigator' (Volery and Lord, 2000, p. 216). Henning and Schnur (2009) conducted an empirical study comparing a VLE group and a traditional learning system group of medical education. They found that although both groups exhibit 'a significant knowledge gain' over their entry knowledge, this knowledge gain is, on an average, twice as great for the e-learning group than for the traditional learners. Further, none of the participants studying through the computer failed their Continuing Medical Education test, whereas the failure rate for those learning from printed material was 20% on an average. Similarly, focusing on Business and Engineering students of an American university, Anitsal et al. (2008) studied the role of personality traits in evaluating the course attributes of VLE based courses and traditional face-to-face courses. Anitsal et al. (2008) concluded that, while online students were more emotionally stable, on-ground students were more extroverted. An examination by Satish U. & Streufert, S. (2002) of the value of a simulation in medicine to optimize decision making demonstrated value over learning via books and lectures when the medical situations were characterized by uncertainty, ambiguity, and time-limitations. Learning outcomes of pilots following flight simulator experiences in a study by Biocca F. & Delaney B. (1995) suggested that trainees did learn more effectively from the interactive virtual environment than from non-interactive media such as textbooks. On the contrary, Piccoli, Ahmad and Ives (2001) investigated the effectiveness of a webbased VLE in basic IT skills training in undergraduate education and found that there were no significant differences between students' performance and satisfaction levels under the two methods.

Some earlier researchers have focused on the role of certain psychological factors in the assessment of VLE. These factors included students' cognitive need (Peng, 2009), attitudes and perceptions (Tanner, Noser and Totaro, 2009). Based on responses from 61 Financial Accounting students in an American university, Peng (2009) examined the

effects of students' cognitive need, computer efficacy and perception on their performance in an online accounting homework system. Peng's study found that learners' intrinsic motivation and computer efficacy do determine their perception of the usefulness of online homework systems in an accounting course. Also, within the context of two other American universities, Tanner, Noser and Totaro (2009) compared the attitudes and perceptions of business faculty members and those of their undergraduate students in relation to online learning. Tanner, Noser and Totaro's study found differences in the perceptions of the two groups (as students' perceptions are significantly more favourable than those of faculty members).

The institutions planning to adopt VLE should derive some guidance from these findings in order to maximize the outcomes of students' online learning experience.

Transfer of Skills acquired in a Virtual Learning Environment to Real Situations

VLEs provide a compelling opportunity to meet the need for training by recreating real-world situations in virtual environments. However, in VLEs, students should be exposed to exactly the same situation they will experience on the job. The aim is that student will react to the situation with the same behaviors or responses that they will use in the real world. Study done by Baker D.P., Gustafson S. and Beaubien J. et al. (2005) suggested that training therefore must necessarily be conducted under the same stressful operating conditions that will be encountered in the real work environment. Zakay D. & Wooler S. (1984) demonstrated that for some tasks normal training procedures did not improve task performance when the task was later performed under stress conditions. In a study by Driskell J.E. & Johnston J.H. (1998), Stress training was designed specifically to teach the skills necessary to maintain effective task performance under stress conditions and has been used successfully in VLE settings.

VLE performance assessment has been described as casual, subjective, unsystematic and inconsistent by Kyllonen, P.C. (2000). VLE are being increasingly used to deliver training in critical, high-level cognitive skills required in critical situations like workplace disasters or emergencies. The above two statements are in dissonance and therefore extra care must be taken to ensure that the VLE design can predict the transfer of skills with a very high degree of probability.

The VLEs often replicate real-world situations from industries including chemical, mining, aviation, Oil and Gas, Power and rail where critical events involve possible physical threat to life. Performance measures are developed to determine whether students have acquired required skills and knowledge and can apply these in the virtual workplace environments. They also provide a method of identifying the performance gaps where skill acquisition is not occurring. Therefore the curriculum design of VLEs should be such that the situation under which the skills are acquired in a VLE setting is similar to the situation in which the skills are to be demonstrated.

Conclusion

Recent developments in computer technology has enabled that any learning environment can be suitably simulated electronically. The benefits of these VLEs far outweigh the disadvantages to both the students and the Institutions. Context-rich guided learning allows the student to internalise knowledge and develop problem-solving skills that can then be used in the real world. The decreasing cost of technology and the rising technical knowledge within educational institutions mean that virtual learning environments is bound to grow in future.

Promoting Collaboration in VLE setting is difficult and VLE will not automatically lead to effective collaboration. We need to develop collaborative learning environments to support students' communication, coordination, and the development of their collaborative skills on one hand and improving the technical, educational and social aspects of VLEs on the other.

While implementation of VLE for a specific learning outcome is a welcome step, efforts must also be taken to identify the Impact of the VLE on the learning outcome and the measures needed to improve the impact. The idea of using VLE is not merely transfer of information but to provide the students an active learning experience.

There is an important role of VLEs in developing training programs on critical events in safe, controllable environments. However, the students should be exposed to the same cues which they are going experience on the real job. Any deviation between the two factors will lead to dissonance thereby reducing the impact of the VLE. Therefore, the extent to which a particular VLE is effective depends upon the development of strong performance measures.

Bibliography

1. Stonebreaker, P. W. and Hazeltine, J. E. (2004) Virtual learning effectiveness: an examination of the process, *The Learning Organization*, 11(2/3), pp. 209–225.
2. Wilson, B. G. (1996) *Constructivist Learning Environments: Case Studies in Instructional Design* (EnglewoodCliffs, New Jersey: Educational Technology Publications).
3. Piccoli, G., Ahmad, R. and Ives, B. (2001) Web-based virtual learning environments: a research framework and apreliminary assessment of effectiveness in basic IT skills training, *MIS Quarterly*, 25(4), pp. 401–426.
4. Halawi, L., Pires, S. and McCarthy, R. (2009) An evaluation of e-learning on the basis of Bloom's taxonomy:an exploratory study, *Journal of Education for Business*, 84(6), pp. 374–381.

5. Satish, U., & Streufert, S. (2002). Value of a cognitivesimulation in medicine: towards optimizing decisionmaking performance of healthcare personnel. *Qualityand Safety in Health Care* 11:163–168.
6. Biocca, F., & Delaney, B. (1995) Immersive virtual realitytechnology. In: Biocca, F., & Levy, M.R. (eds.),*Communication in the Age of Virtual Reality*. HillsdaleNJ: Lawrence Erlbaum Associates, pp. 57–124.
7. Baker, D.P., Gustafson, S., Beaubien, J., et al. (2005).*Medical teamwork and patient safety: the evidencebasedrelation*. AHRQ Publication No. 05-0053. Agencyfor Healthcare Research & Quality, Rockville, MD.
8. Zakay, D., & Wooler, S. (1984). Time pressure,training and decision effectiveness. *Ergonomics*.27:273–284.
9. Driskell, J.E., & Johnston, J.H. (1998). Stress exposuretraining. In Cannon-Bowers, J.A., Salas, E., (eds.)
10. *Making decisions under stress: Implications for individualand team training*. Washington, DC: AmericanPsychological Association, pp. 191– 217
11. Kyllonen, P.C. (2000). Training assessment. In Tobias,S., Fletcher, J.D., (eds.) *Training and Retrainng: Ahandbook for Business, Industry, Government andthe Military*. New York: Macmillan, pp. 171–207.
12. Bonito, J.A. & Hollingshead, A.B. (1997). Participationin small groups. *Communications Yearbook*20:227–261.
13. Clapper, D.L., McLean, E.R., & Watson, R.T. (1991).An experimental investigation of the effect of groupdecision support on normative influence in smallgroups.
14. Daly, B. (1993). The influence of face-to-face versuscomputer mediated communication channels on collectiveinduction. *Accounting, Management & InformationTechnology* 3:1–22.
15. Dubrovsky, V.J., Kiesler, S., & Sethna, B.N. (1991).The equalisation phenomena: status effects in computermediated and face-to-face decision makinggroups. *Human–Computer Interaction* 6:119–146.
16. George, J., Easton, G., Nunamaker, J., et al. (1990). Astudy of collaborative group work with and withoutcomputer based support. *Information System Research*1:394–415.
17. Hiltz, S.R., Johnson, K., & Turoff, M. (1986). Experimentsin group decision making, 1: communicationprocesses and outcome in face-to-face vs. computerized conferences. *Human Communication Research*13:225–252.

18. McLeod, P. L. (1992). An assessment of the experimental literature on electronic support of groupwork: results of a meta-analysis. *Human-Computer Interaction* 7:257–280.
19. Rice, R.E. (1984). Mediated group communication. In: R.E. Rice & associates (eds.), *The new media: communication research and technology*. Beverley Hills, CA: Sage, pp. 129–154.
20. Siegel, J., Dubrovsky, V., Kiesler, S., et al. (1986). Group processes in computer mediated communication. *Organisational Behaviour & Human Decision Processes* 37:157–187.
21. Straus, S. (1996). Getting a clue: the effects of communication media and information distribution on participation and performance in computer mediated and face-to-face groups. *Small Group Research* 27:115–142.
22. Straus, S., & McGrath, J. E. (1994). Does the medium matter? The interaction of task type and technology on group performance and member reactions. *Journal of Applied Psychology* 79:87–97
- Mercer, N. (2003). *Guided construction of knowledge: talk amongst teachers and learners*. Clevedon: Multilingual Matters.
23. Marttunen, M., & Laurinen, L. (2001). Learning argumentation skills in networked and face-to-face environments. *Instructional Science* 29:127–153.
24. Baltes, B.B., Dickenson, M.W., Sherman, M.P., et al. (2002). Computer-mediated communication and group decision making: a meta analysis. *Organisational Behaviour and Human Decision Processes* 87:156–179.
25. Kollar, I., Fischer-Kirschner, P.A., Strijbos, J.W., & Martens, R.L. (2004). CSCL in higher education? A framework for designing multiple collaborative environments. In: Strijbos, J.W., Kirschner, P.A., & Martens, R.L. (eds.), *What we know about CSCL in higher education*. Dordrecht, NL:
26. Kluwer-Guzdial, M. & Turns, J. (2000). Effective discussion through a computer mediated anchored forum. *Journal of the Learning Sciences* 9:437–469.
27. Drago, W., Peltier, J. W., Hay, A. and Hodgkinson, M. (2005) Dispelling the myths of online education: learning via the information superhighway, *Management Research News*, 28(7), pp. 1–17.
28. Volery, T. and Lord, D. (2000) Critical success factor in online education, *The International Journal of Education Management*, 14(5), p. 216

29. Henning, P. and Schnur, A. (2009) E-learning in continuing medical education: a comparison of knowledge gain and learning efficiency, *Journal of Medical Marketing*, 9(2), pp. 156–162.
30. Anitsal, M. M., Anitsal, I., Barger, B., Fidan, I. and Allen, M. R. (2008) Student evaluations of course attributes of online courses versus on-ground courses: impact of student personality traits, *Allied Academies International Conference. Academy of Marketing Studies Proceedings*, 13(1), pp. 1–8.
31. Satish, U., & Streufert, S. (2002). Value of a cognitive simulation in medicine: towards optimizing decisionmaking performance of healthcare personnel. *Quality and Safety in Health Care* 11:163–168.
32. Biocca, F., & Delaney, B. (1995) Immersive virtual reality technology. In: Biocca, F., & Levy, M.R. (eds.), *Communication in the Age of Virtual Reality*. Hillsdale NJ: Lawrence Erlbaum Associates, pp. 57–124.
33. Chattopadhyay, D. and Sumrall, D. (2007) E-learning in a multicultural environment using a publicly available internet platform: case study of an USA – Ukraine university partnership, *Journal of Global Business Issues*, 1(1), pp. 35–42.
34. McKeough, Z. J. (2009) Emergence of e-learning, *The Australian Journal of Physiotherapy*, 55(1), pp. 69–70.
35. Omoteso, K., Patel, A. and Scott, P. (2007) Information and communications technology and organisations: a meta-level perspective, *The International Journal of Technology, Knowledge and Society*, 3(3), pp. 19–27.
36. Sawaan, A. (2006) Studying the implications of hidden learning styles by tracing learners' behaviors in an e-learning system, unpublished dissertation, University of Louisville,
37. Kentucky Potter, B. and Johnston, C. (2006) The effect of interactive on-line learning systems on student learning outcomes in accounting, *Journal of Accounting Education*, 24(1), pp. 16–34.
38. Stanley, T. and Edwards, P. (2005) Interactive multimedia teaching of accounting information system (AIS) cycles: students' perceptions and views, *Journal of Accounting Education*, 23(1), pp. 21–46.
39. Lightner, S. and Olson, C. (2001) Offering a globally-linked international accounting course in real-time: a sharing of experiences and lessons learned, *Journal of Accounting Education*, 19(4), pp. 247–263.

40. Brown, K. M. (1996) The role of internal and external factors in the discontinuation of off-campus students, *Distance Education*, 17(1), pp. 44–71.
41. Handy, S. A. (2005) An exploratory study of learners' use of a computerised accounting tutorial, *Information Technology, Learning and Performance Journal*, 23(2), pp. 17–29.
42. Maki, R. H., Maki, W. S., Patterson, M. and Whittaker, P. D. (2000) Evaluation of a web-based introductory psychology course: learning and satisfaction in on-line versus lecture courses, *Behavior Research Methods, Instruments and Computers*, 32(2), pp. 230–239.
43. Bleed, R (2001) A hybrid campus for the new millennium, *Educause Review*, January/February, 16–24
44. Rao, A. and Walsh, R. (2000) Ways to promote participation in the online introductory accounting courses, *Proceedings of the Academy of Educational Leadership*, 5(1), pp. 61–65.
45. Love, N. and Fry, N. (2006) Accounting students' perceptions of a virtual learning environment: springboard or safety net? *Accounting Education: An International Journal*, 15(2), pp. 151–166.
46. Hussin, H., Bunyarit, F. and Hussin, R. (2009) Instructional design and e-learning: examining learners' perspective in Malaysian institutions of higher learning, *Campus Wide Information System*, 26(1), pp. 4–19.
47. Vermunt, J. D. (1998) The regulation of constructive learning process, *British Journal of Educational Psychology*, 68(2), pp. 149–171.
48. Peng, J. C. (2009) Using an online homework system to submit accounting homework: role of cognitive need, computer efficacy and perception, *Journal of Education for Business*, 84(5), pp. 263–268.
49. Tanner, J. R., Noser, T. C. and Totaro, M. W. (2009) Business faculty and undergraduate students' perceptions of online learning: a comparative study, *Journal of Information Systems Education*, 20(1), pp. 29–40.
50. Gormley, G., Collins, K., Boohan, M., Bickle, I. and Stevenson, M. (2009) Is there a place for e-learning in clinical skills? A survey of undergraduate medical students' experiences and attitudes, *Medical Teacher*, 31(1), pp. 6–12.