ISSN: 1545-679X

Information Systems Education Journal

Volume 2, Number 18 http://isedj.org/2/18/ March 30, 2004

In this issue:

Integrated Learning Nets: Applications to Business Education

Owen P. Hall, Jr
Pepperdine University
Malibu, CA 90263

Charles A. Morrissey
Pepperdine University
Malibu, CA 90263

Abstract: Distance learning has come a long way since Sir Isaac Pitman initiated the first correspondence course in the early 1840's. Today the number of working adults who are returning to the classroom is growing rapidly as a result of changing market conditions and technological developments. These dynamics call for new and innovative systems for providing instructional content to the business community. To meet these challenges the traditional classroom approach to business instruction is giving away to a more holistic learning paradigm where both the pedagogical and andragogical focus is on knowledge acquisition and management. The one-size fits all educational approach of the past is being replaced by customized learning systems. The purpose of this paper is to introduce a web-based learning system for delivering management education. This learning net replaces the three pillars of traditional instruction – fixed time, fixed location and fixed learning pace – with a more flexible and customized approach for meeting the demands of working adults enrolled in a business degree program.

Keywords: Business teaching strategy, distance learning, on-demand education, knowledge systems, Internet

---

Recommended Citation: Hall and Morrissey (2004). Integrated Learning Nets: Applications to Business Education. *Information Systems Education Journal, 2* (18). http://isedj.org/2/18/. ISSN: 1545-679X. (Preliminary version appears in *The Proceedings of ISECON 2003:* §4131. ISSN: 1542-7382.)

This issue is on the Internet at **http://isedj.org/2/18/**

The **Information Systems Education Journal** (ISEDJ) is a peer-reviewed academic journal published by the Education Special Interest Group (EDSIG) of the Association of Information Technology Professionals (AITP, Chicago, Illinois). • ISSN: 1545-679X. • First issue: 8 Sep 2003. • Title: Information Systems Education Journal. Variants: IS Education Journal; ISEDJ. • Physical format: online. • Publishing frequency: irregular; as each article is approved, it is published immediately and constitutes a complete separate issue of the current volume. • Single issue price: free. • Subscription address: subscribe@isedj.org. • Subscription price: free. • Electronic access: http://isedj.org/ • Contact person: Don Colton (editor@isedj.org)

The Information Systems Education Conference (ISECON) solicits and presents each year papers on topics of interest to IS Educators. Peer-reviewed papers are submitted to this journal.

EDSIG activities include the publication of ISEDJ, the organization and execution of the annual ISECON conference held each fall, the publication of the Journal of Information Systems Education (JISE), and the designation and honoring of an IS Educator of the Year. • The Foundation for Information Technology Education has been the key sponsor of ISECON over the years. • The Association for Information Technology Professionals (AITP) provides the corporate umbrella under which EDSIG operates.

Integrated Learning Nets: Applications to Business Education

Owen P. Hall, Jr., P.E., Ph.D.
and
Charles A. Morrissey, Ph.D.
Pepperdine University
The George L. Graziadio School of Business & Management
Malibu, CA 90263

ABSTRACT

Distance learning has come a long way since Sir Isaac Pitman initiated the first correspondence course in the early 1840's. Today the number of working adults who are returning to the classroom is growing rapidly as a result of changing market conditions and technological developments. These dynamics call for new and innovative systems for providing instructional content to the business community. To meet these challenges the traditional classroom approach to business instruction is giving away to a more holistic learning paradigm where both the pedagogical and andragogical focus is on knowledge acquisition and management. The one-size fits all educational approach of the past is being replaced by customized learning systems. The purpose of this paper is to introduce a web-based learning system for delivering management education. This learning net replaces the three pillars of traditional instruction -- fixed time, fixed location and fixed learning pace -- with a more flexible and customized approach for meeting the demands of working adults enrolled in a business degree program.

Keywords: Business teaching strategy, distance learning, on-demand education, knowledge systems, Internet

1. INTRODUCTION

The number of working adults who are returning to the classroom is growing rapidly. The College Board reports that nearly 75% of all students enrolled in higher education also work (King, 2002). Business education for working adults suggests the need for a combined pedagogical (instructor based learning) and andragogical (self-directed learning) approach. This mixed approach is due, in part, to the proposition that working adults possess both a rich experiential base and a process focus for learning (Monks, 2001). Working adults need both flexibility and indirect support in undertaking a business degree program. Typically, the working business student is interested in a practical curriculum that focuses on results and convenience. To meet these demands, the traditional method of knowledge transfer that features the constraints of fixed location, time and learning pace is being replaced with more user friendly and customized learning systems (L. Smith, 2001). The Internet is the key ingredient in this new delivery stratagem. Today, web based distance learning in higher education and industry is experiencing rapid growth (Bertagoli, 2000). Current estimates suggest that the Internet will become a primary delivery vehicle for MBA programs (Swift, 2002). Many working adults who have been exposed to web based learning tend to favor this education on-demand delivery format (Lundgren, 2003). Two primary implementing issues associated with web-based knowledge systems are insuring adequate quality control and providing in-depth feedback (Newman, 1999).

The complexities and interrelated nature of modern business practice call for an integrated learning approach (Goffin, 1998). The focus of an integrated learning environment is on how management functions such as operations, finance and marketing are linked. Furthermore, it has been long recognized that active learning is more effective than passive learning and that learners need feedback early and often (W. Smith, 2002). These principles provide the impetus for web based asynchronous learning (Boticario, 2002). In asynchronous learning content and know-how is provided outside the walls of the traditional classroom at a time and place of the student's choosing (Jorgensen, 2002). While asynchronous content delivery via the Internet is the essential ingredient in the new learning paradigm, there are a variety of complementary systems that also need to be employed. Some examples include:

interactive classroom team presentations and interactive laboratory team simulations. One learning stratagem that recognizes the need for a proactive and integrated learning experience is the Instructional Management System (IMS) cooperative initiative (Graves, 1999).

This initiative is designed to promote systematic thinking regarding the delivery of higher education, to improve learning outcomes and to increase return on instruction investments. Specific principles of the IMS initiative include the following: 1) education involves more than a single course, 2) a course is more than content, 3) content is more important than lecture notes, 4) convenience is important and 5) quality assurance requires an integrated learning approach. The IMS initiative addresses both the quality control and feedback challenges.

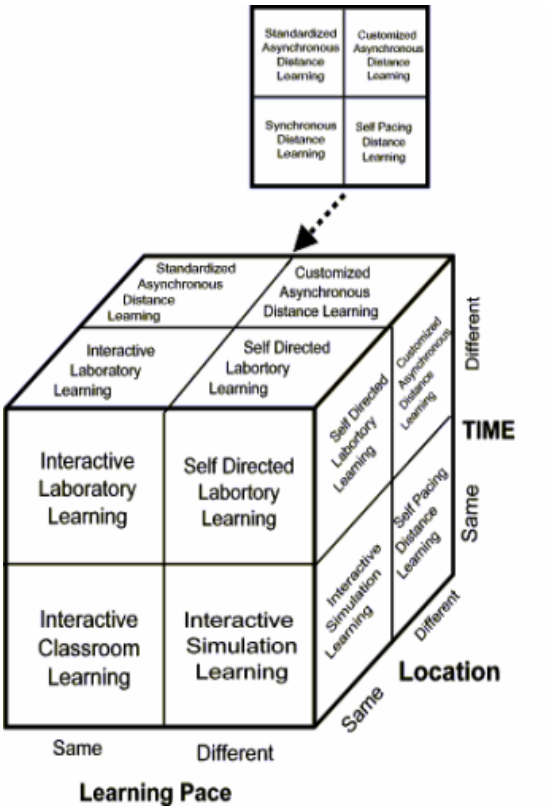

Figure 1 – Knowledge Delivery CUBE

2. KNOWLEDGE DELIVERY CUBE

The knowledge delivery cube (KCUBE) is a customized learning system that provides instructional content and know-how in a variety of settings. KCUBE is based, in part, on the IMS initiative. This dynamic learning system is designed to meet the challenges associated with the growing number of working adults who are returning to the classroom. A conceptual overview of the KCUBE is featured in Figure 1. This learning construct represents a natural extension to the two dimensional model (time and location) outlined by Cukier (2002). The KCUBE adds *learning pace* as the third dimension.

It has long been recognized that working adults do not all learn at the same pace (Kasworm, 2003). Therefore providing self paced "customized" instructional content should further enhance the learning experience for working students. The basic faces of the KCUBE are defined as follows:

- **Customized** asynchronous distance learning (different time, location, pace) - The primary vehicle for providing personalized content based on learning status. This mode requires the student to engage in testing to determine the optimal content level.
- **Standardized asynchronous distance learning** (different time and location, same pace) -The delivery mode for distributing basic study plan content. Specific content includes e-text and lecture notes.
- **Interactive laboratory learning** (different time, same location and pace) – The primary focus is on providing virtual facility tours and computing applications such as forecasting.
- **Self-directed laboratory learning** (different time and pace, same location) – Presents business principles videos and specific computer skill tutorials such as Excel.
- **Interactive classroom learning** (same time, location, pace) – The standard venue for team case presentations and student personal interactions.
- **Interactive simulation learning** (same time and location, different pace) – Team based simulations where the level of learning complexity is based on team skill levels. Typically, skill levels are determined based on testing. One or more advanced students can be assigned to each team to enhance the collaborative learning process.
- **Interactive synchronous distance learning** (different location, same time and pace) – Instructor led lecture and discussions via broadcast conferencing.
- **Self-pacing synchronous distance learning** (different location and pace, same time) – Individual and team based assignments with instructor coaching via broadcast conferencing.

Customized asynchronous distance learning provides a practical environment for competency development as

in the case of business statistics. In this situation the instructor may find some students quickly falling behind due to weak preparation in mathematics. Detection of this condition can be made via Internet testing. Using Internet based content and tutorials students can control their own *pace* of learning that will help ameliorate the frustration of "falling behind." This is particularly important for a prep type course such as business statistics that typically provides the foundation for MBA core courses.

Another major learning objective in business education is to enhance decision-making skills. These include the ability to develop cognitive competencies such as problem solving, critical thinking, formulating questions, searching for relevant information, making informed judgments, using information efficiently, conducting observations, and creating new ideas (Birenbaum, 1996). Business decisions invariably are an outcome of multi-discipline discussions featuring extensive interactions. Standardized asynchronous distance learning provides an ideal vehicle for enhancing students' experiences in understanding how to capture inputs from a distributed group. This process tends to mirror the office environment for many working adults.

A third learning focus is to develop a comprehensive understanding of sources of business information. The continuing enhancement of search engines and digital libraries provides an opportunity for students to drill down on topics, such as industry analysis. A fourth capability enabled by the KCUBE environment is that of group analysis, particularly in adult populations where group members are dispersed. Here the applications are limitless in examining the impact of electronic group's performance vs. face-to-face. This technology also provides a vehicle for stimulating "common interest groups" by allowing individuals to link across classes to other students working on similar projects.

3. INTERACTIVE LEARNING

Constant feedback is essential for optimizing the learning experience (Karuppan, 1999). Internet based instruction provides a 24-7 environment that is ideal for interactive learning. A growing body of evidence indicates that flexible and customized learning systems like the KCUBE are particularly effective for working adults involved in a business degree program (Lau, 2000; Sommer, 1999). Specific benefits of this holistic learning approach are:

- KCUBEs offer a more disciplined way of learning in that lesson plans are both structured and tailored to meet specific student needs. They provide a high degree of interaction and collaboration that is superior to traditional classroom methods.
- KCUBEs are a long sought solution to the ongoing problems associated with adult education. Students can now enjoy a dynamic, personal and scaleable experience for continuous learning.
- KCUBEs provide the learner with a purposeful entry to the Internet and online resources.
- KCUBEs connect learners and instructors on a 24/7 basis. They also underpin new patterns of relationships between education and business through virtual arrangements such as facility tours.
- KCUBEs facilitate the capability to process multiple tasks nearly simultaneously e.g., reading and data processing. This multi-tasking capability is essential in modern business practice.

A fundamental tenet of the KCUBE design is that one size does not fit all. That is, students do not learn at the same pace, and they are impacted differently by the learning environment. The key to effective learning is a customized lesson plan wherein the specific strengths and weaknesses of each student are identified, measured and appropriate feedback is provided. Online assessment is a must for effective distance learning instruction (Creaser, 2002). This is where artificial intelligence (AI) systems can play a helpful role. AI can be used to design lesson plans and learning experiences based on student performance and background. The use of AI to assist in the learning process is receiving increased attention (Lebouche, 1998). More specifically, synthetic agents, a major branch of AI, can generate customized learning plans derived from student accomplishments and expectations using a set of conditional rules. For example, if a student is having difficulty mastering business forecasting as detected by testing or self-assessment then the synthetic agent would prescribe specific additional learning content to be provided via the KCUBE. This content can be in the form of videos, computing tutorials or simulations. Figure 2 illustrates the overall design concept.

Typically, synthetic agents should possess the following four basic characteristics: autonomy, proactively, adaptability and sociability (Allen, 2000). A well-designed synthetic tutorial agent should be able to assess the student's current knowledge state and to modify both the lesson plan and content level. One approach, albeit not the only one, for evaluating a learner's knowledge state is via real time and ongoing testing. Additionally, the "social" interface between the agent and the learner should be highly visual. It is within this design context that the specific learning objectives can be achieved and maintained (Matsatsinis, 2003).

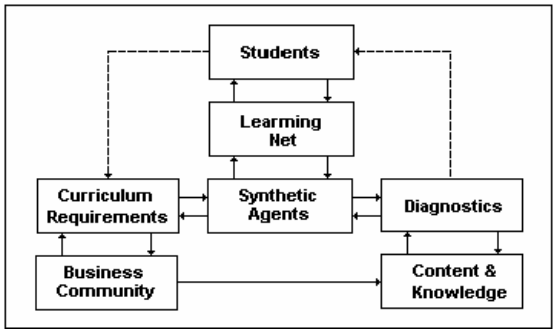

Figure 2 – Synthetic Agent Learning Design

4. KCUBE APPLICATIONS

The KCUBE design concept was implemented using a commercially available content web provider in several graduate level MBA business classes over the past several years. To date, approximately 300 students have been exposed to the KCUBE learning system. Most of the students held middle management type positions. Overall students found the KCUBE approach more effective in delivering content and know-how than previously experienced course formats. Presented below are some specific observations gleaned from user feedback.

- Students were able to remain current with the assignments while on extended travel status.
- Students increased their use of library assets.
- Students found the virtual facility tours helpful in understanding basic operational principles, e.g., how supply chain management is used.
- Students developed a more realistic view of actual business applications through access to large-scale databases, e.g., bureau of labor statistics.
- Students got direct experience into the dynamics of business management via on-line business simulations.
- Students appreciated the fact that all course material was available at one easily accessible web site.
- Students improved test score performance through on-line practice tests.

This last observation is illustrated quantitatively in Figure 3. The graphic shows actual midterm exam scores versus average practice Internet test scores. The correlation coefficient is 0.78.

Additionally, there was a very strong positive correlation between the number of times the student took the practice tests and their practice test scores. These results lead to the conclusion that consistent Internet practice testing yields higher actual test scores. One of the primary reasons for this is a layered feedback system. Specifically, this testing system provides: 1) the correct answer, 2) a tutorial on the question subject content and 3) a web link to additional subject material. Many students found that this interactive testing process contributed directly to improving their overall understanding of the subject material. The test questions for each topical area, e.g., forecasting, are randomly generated from a large test bank. Additionally, the system includes both a timed practice midterm and final exam. This approach supports one of the major tents of an effective learning process namely variety. The instructor can use the test results for both direct counseling as well as for additional content design.

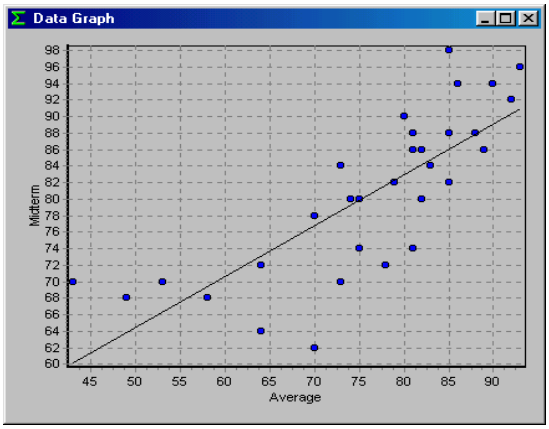

Figure 3 – Practice versus Actual Midterm Exam Scores

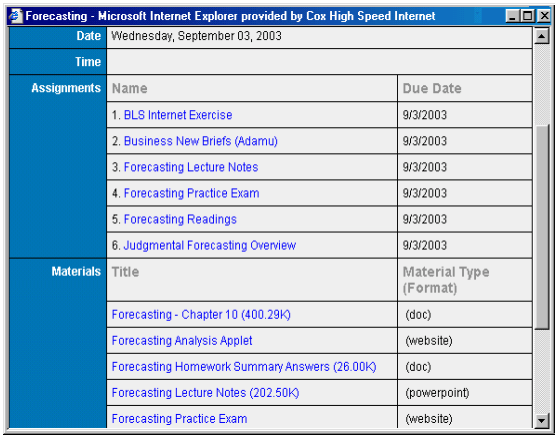

Figure 4 – Assignment and Content Menu Screenshot

Convenience and ease of use are essential ingredients in a KCUBE application. Figure 4 shows a standard user interface screen for a specific learning session, i.e., forecasting. This learning menu would appear after the user has logged-on to the KCUBE web site. The user can then select the specific learning assignment by

simply clicking on the desired title. For example, a PowerPoint overview on forecasting can be obtained by selecting the lecture notes. The KCUBE system also features document exchange and a chatroom which helps facilitate the development of team presentations.

5. SYSTEM IMPLEMENTATION

Currently, the use of e-learning systems throughout the b-school community is growing rapidly albeit unevenly and with mixed results (Blass, 2003). Developing a comprehensive implementation plan is a necessary condition for insuring a successful system deployment. Implementing a KCUBE type design is not a simple task. There are a number of specific steps that must be taken to insure a successful system deployment. These include:

- Think Long Term – Link the KCUBE design to the mission statement of the institution. Look ahead five years in terms of development direction and tempo.
- Content Development – The development and acquisition of web-based content can account for upwards of 50% of the overall budget.
- Comparison Shop – Carefully evaluate the portal providers. There are over 100 of them. Any disruption in providing 24/7 learning will court disaster.
- Phased Approach – Consider implementing the system in a specific program, e.g., executive MBA for gaining experience and confidence.

Student organization represents one of the key factors to the successful implementation of the KCUBE paradigm. Specifically, organizing the students into "knowledge" teams helps insure that no one is left behind. In this way student teams can serve as co-producers of the course since many working adults already have extensive business experience, e.g., project management. Other keys to success are to insure that the system is operational on a 24/7 basis and is rich in content. Students tend to participate to a greater extent in learning systems that are content rich and that feature extensive variety (Kathawala, 2002). Some specific administrative challenges in implementing the KCUBE paradigm include:

- Training faculty for successful system deployment and usage.
- Providing equal access at the highest quality standards.
- Setting specific performance goals and metrics.
- Maintaining consistency across departments and programs.
- Preparing students for entry and ongoing use.
- Sustaining system operation and flexibility.
- Establishing the overall culture.

Typically, developing the internal capability to deploy the KCUBE is complex and expensive. Furthermore, an internalized approach may not take advantage of the ongoing developments in delivery technology, e.g., search engine technology. One emerging implementation strategy, that is designed to help overcome these issues, consists of developing institutional partners with both content and application service providers (Sorel, 2001). This approach focuses heavily on the basic ideas behind supply chain management and is consistent with the increased use of suppliers in large volume operations such as those found in most business programs. Lastly, measuring ongoing effectiveness and performance is key to the successful sustainability of an e-learning system such as the one outlined in this paper (Bersin, 2002).

6. CONCLUSIONS

The use of customized web based learning systems in business education is on the rise (Coppola, 2002). However, much more can be done to meet the ongoing challenges of working adult education. The purpose of this paper is to outline a design for providing business content on an interactive and continuous basis. This system optimizes the use of the Internet to deliver effective distance learning instruction for business courses and programs while simultaneously enhancing faculty and peer group interactions. The KCUBE provides an opportunity for collaborative learning that often has a positive impact on the educational experience (Graham, 2001). Another important feature of the KCUBE is real time feedback. This capability can be provided in a variety of ways including testing and simulations. Real time feedback presents both the instructor and student with insights into subject areas that require more attention. Providing the broadest range of tutorial instruction optimizes students' opportunities for effective learning. Asynchronous real time feedback is particularly attractive for working adults who have difficulty maintaining an ongoing presence on campus. The KCUBE stratagem outlined herein is designed to significantly alter the three pillars of traditional instruction-- fixed time, fixed location and fixed learning pace --with a flexible and customized learning process. Specific benefits of the KCUBE strategy include the following:

- Integrated perspective on the course/program.
- Instructional rich content including real time testing with feedback.
- Courses designed for specific learning applications with real time updating.
- Student team participation and interaction.
- Improved quality control through content integration.
- Direct linkage with Internet and library resources.

The KCUBE is designed to support the ongoing challenges associated with adult distance learning in this new millennium by embodying the three "I's" of effective adult education: integration, interaction and information. Furthermore, this learning system can be used to "link" the various courses that compose the business curriculum. Understanding how the content for a particular course fits into the overall business curriculum is essential. Additionally, a KCUBE based curriculum permits more working adults access to the growing body of management know-how that will allow them to remain competitive in an ever increasing global marketplace. Recent empirical evidence also suggests that KCUBE's blended approach, one combing on-line assets with face-to-face interactions, optimizes the learning process (Harvey, 2003).

A number of additional developmental tasks need to be addressed to further improve the effectiveness of the KCUBE in business education. These efforts include enhanced interactive simulations, real time videos and student performance diagnostics. Furthermore, the use of artificial intelligence models such as expert systems for student assessment will greatly improve the capability of the KCUBE to deliver effective instructional content. In terms of an implementation strategy, consideration should be given to developing a strategic partnership with both content and application service providers. Specifically, using a "supply chain management" implementation strategy should insure both a reliable learning resource as well as timely technological updates.

7. REFERENCES

Allen, M., (2000). "*The myth of intelligent agents*," Online, v24, i6. p45.

Bersin, J. (2002). "*Measuring e-learning effectiveness*," e-learning, v3, i3, p36.

Bertagnoli, N.S. (2000). "*Pioneering experience in distance learning: lessons learned*," Journal of Management Education, v23, i6, p684.

Biass, E. and A. Davis (2003). "*Building on solid foundations: Establishing criteria for e-learning developments*," Journal of Further & Higher Learning, v27, i3, p227.

Birenbaum, M. (1996). Assessment 2000: towards a pluralistic approach to assessment, in Alternatives in *Assessment of Achievements, Learning Processes and Prior Knowledge*, p3, Kluwer Academic Publishers, Boston.

Boticario, J. and E. Gaudioso (2000). "*Adaptive web site for distance learning*," Campus Wide Information Systems, v17, i4, p120.

Coppola, N.; S. Hiltz, and N. Rotter (2002). "*Becoming a virtual professor: Pedagogical roles and asynchronous learning networks*," Journal of Management Information Systems, v18, i4, p169.

Creaser, K., (2002). "*Online education tools*," Australian CPA, v72, i10, p49.

Cukier**,** W., K.A. Grant, and J. Susla (2002). "*The Costs and Benefits of Learning Technologies*," ISECON2003, November, San Antanio.

Graham, M. and H. Scarborough (2001). "*Enhancing the learning environment for distance education students*," Distance Education, v22, i2, p232.

Graves, W.H. (1999). "*The instructional management system cooperative: converting random acts of progress into global progress*," Educom Review, v34, i6, p32.

Goffin, K. (1998). "*Operations management teaching in European MBA programs*," International Journal of Operations & Production Management, v18, n5-6, p424.

Harvey, K. (2003). "It's all in the mix," The Banker, v153, i927, p135.

Jorgensen, D. (2002**).** "*The challenges and benefits of asynchronous learning networks***,**" Reference Librarian, i77, p3.

Karuppan, M.K. (1999). "*Empirically Based Guidelines for Developing Materials on the Web*," Business Communication Quarterly, v62, i3, p37.

Kasworm, C. (2003). "*Adult meaning making in the undergraduate classroom*," Adult Education Quarterly, v53, i2, p81.

Kathawaia, Y.; K. Abdou, and D. Elmuti (2002). "*The global MBA: a comparative assessment for its future*," Journal of European Industrial Training, v26, i1, p14.

King, T. and E. Bannon (2002). "*At What Cost?*" Higher Education Project, Washington, D.C.

Lau, R.S.M, (2000). "*Issues & Outlook of e-learning*," Dakota Business Review, v59, i2, p1.

Lebouche, R. (1998). "*The successive contributions of computers to education: A survey*," European Journal of Engineering Education, v23, i3, p297.

Lungren**,** T. and Nantz, K. (2003). "*Student attitudes towards Internet courses: A longitudinal study*," Journal of Computer Information Systems, v43, i3, p61.

Matsatsinis, N.; P. Moraitis, V. Psomatakis, and N. Spanoudakism (2003). "*An agent-based system for products penetration strategy selection,*," Applied Artificial Intelligence, v17, i10, p901

Monks**,** K. and J.S. Walsh (2001). "*The role of postgraduate education in management development*," Journal of European Industrial Training, v23, i2, p148.

Newman, R. and F. Johnson (1999). "*Sites or power and knowledge*? Towards a Critique of the Virtual University," British Journal of Sociology of Education, v20, i1, p79.

Smith, L.J. (2001). "*Content and delivery: A comparison and contrast of electronic and traditional MBA marketing planning courses*," Journal of Marketing Education, v23, i1, p35.

Smith, W.D. (2002). "*Applying Angelo's teacher's dozen to undergraduate introductory economic classes: A call for greater interactive learning*," Eastern Economic Journal, v28, i4, p539.

Sonner, B.S. (1999). "*Success in capstone business courses - assessing the effectiveness of distant learning*," Journal of Business Education, v74, i4, p243.

Sorel, R., R. Dear, and D. Edge (2001). "Evolution of web-based distance learning strategies," International Journal of Educational Management, v15, i4/5, p245.

Swift, C.D. (2002). "*Profile of a Consortium*," AACSB 2002 Continuous Improvement Symposium, Washington D.C. September.

Owen P. Hall, Jr. (ohall@pepperdine.edu) received his Ph.D. from the University of Southern California and undertook post-doctoral studies at the Center for Futures Research. Dr. Hall is a Professor of Decision and Information Systems at the George L. Graziadio School of Business and Management, Pepperdine University. He is the recipient of a Charles Luckman teaching fellowship. He is a registered professional engineer, State of California. Dr. Hall is the author of four textbooks on computer based decision support systems. He has also authored over 50 technical papers on the subjects of decision support systems, forecasting software design, distance learning systems and neural networks. Dr. Hall's current area of research includes the application of artificial agents for search engine technology and the developed of Internet based asynchronous learning nets.

Charles A. Morrissey (cmorrissey@aol.com) received his Ph.D. in Executive Management from the Drucker School of Claremont Graduate University with an emphasis in Information Systems. He has over 30 years of management experience in the publication industry. In 1989 Dr. Morrissey joined Pepperdine's Graziadio School of Business and Management as a founding faculty member of their Masters program in Technology Management. He currently serves as Associate Professor of Information Systems. His publications and presentations focus on the impact of the Internet on teaching and learning in higher education. Dr. Morrissey's current area of research centers on the development of distance learning applications for working adults.