# Customized Learning Systems:
# Introducing the Knowledge Delivery Cube

Owen P. Hall, Jr.
Charles A. Morrissey
Pepperdine University
The George L. Graziadio School of Business & Management
400 Corporate Pointe
Culver City, CA 90230
ohall@pepperdine.edu

## 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 the knowledge delivery cube stratagem. This learning system is designed to replace the three pillars of traditional instruction: fixed time, fixed location and fixed learning pace with a more flexible and customized approach for delivering management education.

**Keywords:** business teaching strategy, distance learning, knowledge management, Internet

## 1. INTRODUCTION

The demand for students who can compete in the expanding global marketplace and 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, Internet 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 type programs (Swift, 2002). Many working adults tend to favor this content delivery approach (Lundgren, 2003). Nevertheless, Internet instruction is not without its critics (Confessore, 1999; Newman, 1999). The primary concerns are the lack of adequate quality control, standards, ethical issues and instructor – student interaction.

The complexities and interrelated nature of modern business practice call for an integrated learning approach (Goffin, 1998). In an integrated learning environment the focus 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 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: 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.

## 2. KNOWLEDGE DELIVERY KCUBE

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.
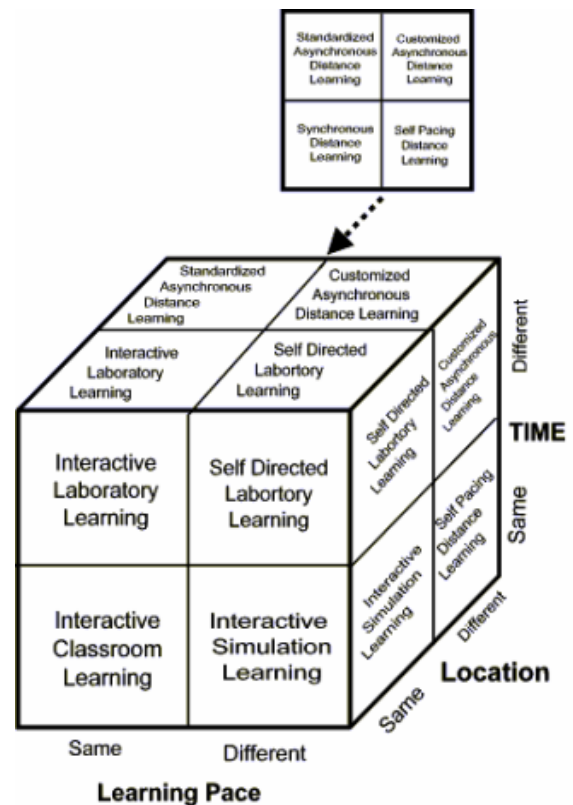


**Figure 1** – Knowledge Delivery CUBE

It has been recognized that working adults do not learn at the same pace (Kasworm, 2003). Therefore providing self paced "customized" instructional content will further enhance the learning experience. The basic faces of the KCUBE are described below:

- **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 & 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 & pace) – The primary focus is on providing virtual facility tours and computing applications such as forecasting.

- **Self-directed laboratory learning** (different time & 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 & 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 & pace) – Instructor led lecture and discussions via broadcast conferencing.

- **Self-pacing synchronous distance learning** (different location & pace, same time) – Individual and team based assignments with instructor coaching via broadcast conferencing.

For example, customized asynchronous distance learning provides an ideal 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 like business statistics that typically provides the foundation for standard MBA core type courses.

Another major learning objective in business education is to enhance decision-making skills. Specifically 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). Invariably business decisions are an outcome of multi-discipline discussions with extensive interactions. Standardized asynchronous distance learning provides an ideal vehicle for enhancing students' experience in understanding how to capture inputs from a distributed group. This process tends to mirror the office environment for many working adults.

## 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. There is a growing body of evidence 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). Specifically:

- 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 like 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 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 test performance. The use of AI to assist in the learning process is receiving increased attention (Lebouche, 1998). More specifically, expert systems, a major branch of AI, can generate customized learning systems 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 AI based system 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

## 4. SYSTEM IMPLEMENTATION

The KCUBE design concept was implemented using a commercially available content web provider. Presented below are some more specific observations gleaned from the use of the KCUBE design in several graduate level business classes over the past two years. There were a total of 12 classes each consisting of approximately 20 working adults. Most of the students held middle management type positions, e .g., department manager.

- Students were able to remain current with the assignments and content even while on extended travel status.
- Students increased their use of Internet and library assets.
- Students found the virtual facility tours helpful in understanding basic operational principles, e.g., how supply chain management is used in the automotive industry.
- 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 site and connected location.
- Students improved test score performance through on-line practice tests.

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., supply chain management. Other keys to success are to insure that the system is operational on a 24/7 and is rich in content. Students tend to participate more in learning systems that are content rich with 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.
- Maintaining system operation and viability.
- 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 like those found in most business programs.

## 5. CONCLUSIONS

The use of customized learning systems such as the KCUBE 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 provide effective distance learning instruction for business courses and programs while enhancing faculty and peer 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:

- 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.

A number of additional developmental tasks need to be addressed to further enhance the effectiveness of the KCUBE in business education. These include enhanced interactive simulations, real time videos and student performance diagnostics. Business simulations have been found to be one of the most effective means for teaching management principles. Principle based videos, e.g., supply chain management, which can be viewed on demand offer the opportunity for ongoing review. Furthermore, the use of artificial intelligence models like expert systems for student assessment will greatly improve the capability of the KCUBE to deliver effective instructional content. In terms of an implementation strategy perhaps the most effective approach is to utilize the supply chain management paradigm that involves extensive outsourcing. Specifically, consideration should be given to developing a strategic partnership with both content and application service suppliers.

## 6. REFERENCES

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

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

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.

Confessore, N., 1999, "*The virtual university*," The New Republic, v221, i14, p26.

Coppola, N.; Hiltz, S.; Rotter, N., 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., Grant K.A., Susla, J., 2002, "*The Costs and Benefits of Learning Technologies*," ISECON2003, November, San Antanio.

Graham, M, & Scarborough, H., 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.

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

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

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

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

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

Monks**,** K., & Walsh, J.S., 2001, "*The role of postgraduate education in management development*," Journal of European Industrial Training, v23, i2/3/4, p148.

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

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

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.

Sorel, R.; Dear, R.; Edge, D., 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.