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... For Educators, Trainers, and Leaders

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Distance Learning, an official publication of the United States Distance Learning Association (USDLA), is sponsored by the USDLA, by the Fischler School of Education and Human Services at Nova Southeastern University, and by Information Age Publishing. Distance Learning is published four times a year for leaders, practitioners, and decision makers in the fields of distance learning, e-learning, telecommunications, and related areas. It is a professional magazine with information for those who provide instruction to all types of learners, of all ages, using telecommunications technologies of all types. Articles are written by practitioners for practitioners with the intent of providing usable information and ideas for readers. Articles are accepted from authors with interesting and important information about the effective practice of distance teaching and learning.

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Distance Learning … for Educators, Trainers, and Leaders is undergoing a series of changes that will be explained in an upcoming issue.

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Who Are the Key Stakeholders in a Quality E-learning Environment?

Abed H. Almala

Quality e-learning is a Web-based learning environment designed, developed, and delivered based on several dynamic principles, such as institutional support, course development, teaching/learning, course structure, student support, faculty support, and evaluation and assessment (Phipps & Merisotis, 2000). Ensuring a quality e-learning environment is essential in providing students with the full range of benefits that e-learning entails. Designing and operating a quality e-learning course and program require effective cooperation of dynamic and committed individuals (Harasim, 1999). According to Hoffman and Ritchie (2001), "a team approach to web-based course development is not only convenient and helpful, but perhaps necessary to ensure quality instruction in this emerging medium" (p. 217). The following briefly describes the roles of four key stakeholders in a quality e-learning environment and the challenges they face and leadership roles they play.

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E-Learners

The most important stakeholders in a quality e-learning course and program are the learners. Student satisfaction with e-learning is vital. Campos and Harasim (1999) collected a sample of 40 students' questionnaires at the Virtual-U, an e-learning environment established by Simon Fraser University, in Canada, with faculty participation from institutions of higher education in the United States and Europe, and found that 84% are satisfied with their e-learning experience. This positive perception depends on several factors. First, everyone in the e-learning program must be there to facilitate and support student learning. However, this brings more accountability for students and everyone in the institution. E-learning demands quality learning environments. One key component of quality e-learning is student support. For e-learning students, Vrasidas

and McIsaac (1999) stressed "the importance of prior experience with computers, proficiency in using the conferencing system, participating in chats, and moderating online discussions" (p. 31). Responding effectively to the learner's needs is a quality e-learning issue and considered one of the principles of every quality e-learning course and program (Phipps & Merisotis, 2000).

LaPadula (2003) conducted a study with 92 e-learning students who were taking online courses during the spring semester of 2001, on the level of satisfaction with student support services offered at the New York Institute of Technology. LaPadula (2003) concluded that the results of her study ranked support services in this order: library, admissions, textbooks, prior learning, credit evaluation, academic advising, financial aid, bursar, registrar, and student commons. Those e-learning students indicated an interest in additional services, such as social services, more academic advising/career counseling, more technical assistance and personal/mental health counseling.

E-learning frees learners from time and place constrictions. It could also be cost-effective to those employed e-learners who pay all or most of their class tuition and fee. According to Valet (2003), "Brandon Hall, an e-learning researcher, says companies that use online training can see an average of 50% in time savings and 40% to 60% percent in cost savings compared to traditional training" (p. 42).

E-learning offers many advantages to learners, such as direct access to the instructor, access to global resources, expansion of collaborative assignments, and consistency of instruction. The primary task here is for the student to learn and be responsible for her own learning (Cheurprakobkit, Hale, & Olson, 2002; Picciano, 2001; Murphy, Cathcart, & Kodali, 1997). These research studies reveal that prior experience in an e-learning environment, effective time management skills, motivation, prior planning and training, and an ability to analyze and apply effective learning strategies are critical factors for students to succeed in e-learning classes. These studies have also shown that e-learners must be taught by qualified instructors and provided with appropriate training and orientation to ensure that they possess the technological, learning and organizational skills to succeed in a quality web-based e-learning environment.

INSTRUCTORS

The consistent development of high-quality e-learning courses and programs depends largely upon the availability and enthusiastic support of well-trained faculty who are provided sufficient resources, allotted the development time to produce state-of-the-art and appropriate curricula and instruction, and assured that their efforts will be fairly compensated and evaluated by their institutions. McKenzie, Mims, Bennett, and Waugh (2000) concluded that 76% of the e-learning instructors at the State University of West Georgia "felt that they spent more time preparing and delivering WebCT courses compared to traditional face-to-face courses" (p. 5). According to Conrad (2002), "the instructor's role in online education, in the constructivist view, is a facilitative and collaborative presence that invites peer interaction among learners and a more democratic sharing of responsibility than what may have occurred in some traditional classes" (p. 212). However, the degree to which each of these stipulations is reflected in current practice varies widely from one institution to another, depending on the availability of faculty support, the college curriculum and student population.

There are special tasks that confront e-learning instructors and developers. For example, the instructor must:

- Develop a clear understanding of the culture of e-learning settings,
- Create and organize content to meet the instructional and technical design requirements of an effective e-learning course and program and respond effectively to its multiple and diverse learners,
- Develop an understanding of how best to teach the content and develop a good working relationship with technical experts and support staff, and
- Function effectively as a skilled facilitator and diplomat, content provider, and team leader (Mortera-Gutierrez, 2002; University of Idaho, 1995).

To continue accomplishing these tasks effectively, faculty members need continuous training in designing, developing and delivering quality Web-based learning courses. Higher education institutions now recognize that not all faculty can or will use technology, that they must foster the development of those who wish to do so, and rely on peer-interaction to equip new Web-based e-learning faculty members with the sound principles and skills of e-learning instructional design (Mortera-Gutierrez, 2002). Cheurprakobkit et al. (2002) conducted a quantitative study with 64 technical facilitators at the University of Texas System and found that 64% of the study participants expressed their satisfaction that "most faculty involved in web-based courses are willing to obtain new computer knowledge and skills in order to improve the quality of their course" (p. 250). Many instructors are not skilled in the technical aspects pertaining to the electronic delivery of instruction. Instructors should invest their efforts in adding value to instruction rather than learning the technical skills, which are in a continuous state of change (Rowe, 1999). Dede (1996), an advocate of e-learning, resonated this need of training when he concluded that "the most significant influence on the evolution of distance education will not be the technical development of more powerful devices, but the professional development of wise designers, educators, and learners" (p. 24).

Further, Rowe (1999) emphasizes that faculty can be encouraged to use technology by providing them with incentives such as internal grants for curricular innovation, appropriate teaching loads, research assistants who can help in implementing technical applications, and intensive training in the use of instructional technology. Institutions need to ensure that all faculty members have current network workstations in their offices. Another strategy for faculty involvement is a Web communication-based solution. The solution consists of two parts: (1) Web-based computer conferencing technology to facilitate both sharing information about e-learning and increased interaction and collaboration among faculty members, and (2) The capability to accumulate resources to be used for instructor-instructor interaction (Smith, Ferguson, & Caris, 2003).

Faculty, as knowledge experts in a specific content, should not assume all the roles. They should not do everything related to their own e-learning course. Many faculty members design the course, develop the course, and deliver the course. Institutions of higher education need to increase training for e-learning faculty in e-learning instructional design models, provide them with effective tools, a generous monetary support system and sabbatical time, user-friendly and reliable technology tools, and flexible access to technical support services.

Technical Support Staff

These individuals serve as active members of a quality e-learning course team. According to Hoffman and Ritchie (2001), "successful electronic course development teams will include a dedicated technical support person" (p. 217). Technical staff provide support and services in meeting

the special needs of all learners, such as setting up equipment, assisting in training, and fixing technical glitches. Proactive support staff provide basic leadership in maintaining a good rapport between the learners and the instructor, and actively promote communication among all participants in course development. Energetic support staff even suggest instructional improvement practices, collect assignments, and proctor tests (University of Idaho, 1995). They employ effective strategies to achieve the goals of an e-learning course and program and manage their instructional affairs (Rucker, 1998). According to the Continuing Education Division of the University of Idaho (1995),

> Most successful distance learning programs consolidate support service functions to include student registration, materials duplication and distribution, textbook ordering, securing of copyright clearances, facilities scheduling, processing grade reports, managing technical resources, etc. Support personnel are truly the glue that keeps the distance learning effort together and on track.

For quality Internet-based programs, there is a critical need for experienced technical developers and instructional technologists to bring to the table the knowledge of state-of-the-art technologies applicable to planning instruction electronically and the skills for implementing those applications (Rucker, 1998; Minoli, 1996; Murphy et al., 1997; Polyson, Saltzberg, & Godwin-Jones, 1996).

Leaders

E-learning leaders have an important role to play in the e-learning process. An effective leader is someone who has a vision, is able to articulate it, and inspire others to work towards its accomplishment or fulfillment. Leadership means knowledge and the ability to impart it to others, inspire them to action, and empower them to work for a greater good. Gardner (1995) spoke of reaching followers using several methods; finding those that reach the heart of the people and meet their needs. A positive characteristic of a good leader is his or her ability to empower the organization's stakeholders, to provide avenues for all involved to achieve and to contribute, and to collaborate rather than to dominate.

In order for distance learning leaders at an institution of higher education to be successful and responsive to stakeholders, they must know who the stakeholders are and what the stakeholders want. Warren and Townsend (1995) stress that leaders today must maintain sensitivity to the views of everyone who has a stake in the organization, thus realizing that everyone can make a significant contribution. Effective distance learning leaders must have positive influences on these stakeholders and be willing to make decisions that have the stakeholders' best interests in mind (Beaudoin, 2003). Effective and successful distance learning leaders at a higher education institution should mainly focus on the distance learning environment, always strive for educational excellence and for positive changes that would be beneficial for the entire college community (Beaudoin, 2003). They should also constantly have a clear mission and well-defined goals, an inspiring and creative vision, integrity, a strong sense of motivation and, last but not least, strong willpower (Beaudoin, 2003).

E-learning faculty, staff, and leaders in an educational organization should be seen as a holistic caring unity that primarily focuses on the e-learning environment. According to Pielstick (1998), "the shared nature of the vision is unifying, creating a sense of community" (p. 21). They are all responsible in providing the best e-learning environment for the students by inspiring them, allowing them to grow, empowering them, and supplying them with a solid foundation for quality e-learning principles (Beaudoin, 2003). They

should all be responsible in this endeavor and should always adopt a win-win approach.

In summary, active and successful e-learning leaders need to build a strong working relationship with e-learning faculty and staff. They should be committed to increase faculty's and staff's repertoire of e-learning instructional strategies and design principles through ongoing professional growth activities and financial support. Effective e-learning leaders should make every possible effort to ensure the availability of appropriate technological resources for the program to succeed, make decisions on the academic side of the equation and stress the urgency for meeting the student's learning needs, and finally encourage the e-learning faculty and staff to develop and share their instructional strengths and curricular interests (Beaudoin, 2003; Cintron & Dillon, 1997; University of Idaho, 1995).

Stakeholders' Collaboration

Based on my e-learning experience, as a former student and current instructor, efficient time-management skills are critical for students and professionals alike who are seeking effective learning or training in an optimal e-learning environment. Allocating realistic amounts of time means effective e-learning for students and effective e-learning instruction for faculty. How an e-learning course and program defines time expectations for students, faculty, leaders and other professional staff can establish the basis for high performance for all.

Time management, with good organization of e-learning subject materials, means assignments will be completed fully and in a more timely manner. An e-learning class that involves a time-achievement expectation at the beginning of the course could be helpful in a learner's studying. Conrad (2002) stresses that "building a sense of commitment to the course, and a level of comfort in the course, therefore, can occur concomitantly if the timing of the course start can be integrated into learners' lives with as little stress as possible" (p. 222). In short, this argument suggests that, in a quality e-learning environment, proper planning by all e-learning stakeholders means good learning and successful instructional performance.

Another factor that affects the quality of e-learning is the level of collaboration between the e-learning student and his or her instructor. In the process of learning, mentor and mentee develop a special relationship that is "bidirectional" (Duffy & Cunningham, 1996). They are seeking the other's views, immersed in the learning activities, and learn from and influence one another. Conrad (2002) states that "building community by engaging learners in their learning tasks is one of the first necessary steps toward successful online learning" (p. 210). In other words, the more deeply the mentee is involved in the learning process, the more motivated he or she is.

Final Thoughts

Through constructing knowledge, the e-learning student may face complex issues and will make the effort to find new ways to succeed. The roles of the e-learning stakeholders are to facilitate and energize the learning process. Different points of view, new perspectives, and previous experiences would be shared between both the e-learning students and instructor in synchronous or asynchronous e-learning discussion formats. The e-learning instructor would not impose his or her understanding of the world, but would allow participants to agree or disagree. In doing so, the participants would construct their own understanding of the content through reflection and articulation in a meaningful dialogue.

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K-12 Virtual Schools

The First Steps

Deborah Feliciano

Introduction

One of the most exciting times in education is the implementation of new programs and technology. There is always a danger, however, of the enthusiasm for the innovative program being squelched by the perceptions of stakeholders. Rogers (1962) wrote about how innovations are diffused:

> Getting a new idea adopted, even when it has obvious advantages, is difficult. Many innovations require a lengthy period of many years from the time when they become available to the time when they are widely adopted. Therefore, a common problem for many individuals and organizations is how to speed up the rate of diffusion of an innovation. (p. 1)

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Administrators first need to identify perceived barriers through surveys, interviews, and focus groups. Analyzing these data is the next step in the diffusion process in order to discover any commonalities between various stakeholder groups. The final step is creating staff development sessions to address concerns. Sessions should highlight identified advantages, while specifically addressing the perceived barriers to allay any fears. This article will offer details from a small informal case study conducted by the author, as well as a short review of a larger factor-analytic study conducted by Muilenburg and Berge (2001). Finally, recommendations for educational leadership and professional development will be offered.

Allowing students to participate in virtual classes through the Internet is one technological innovation used by many school districts to enhance academic curriculum and to provide opportunities for advancement. One way of exhibiting an ability to study independently is by successfully taking an online course. Some students attend virtual schools exclusively for reasons including health, family, religious, and work concerns. Twenty thousand students attend the Florida Virtual High School. Others are enrolled in single courses in addition to their traditional classes at school. At Virtual High School, students are enrolled in one class, not an entire program of study. The preceding

examples are only a small portion of the many possibilities available today. Students, parents, and school administrators may want to consider using online classes to supplement academic programs as they strive to prepare students for higher education.

A Case Study

Although popular in some areas of the country, many urban and suburban schools in the northeast have not found a need to enroll students in distance education of any kind. A small public school district in the northeast is considering implementing virtual classes in their middle/high school. Stakeholders in the district include students, teachers, administrators, parents, and board of education members. In order to identify stakeholder perceptions, the author questioned members of some of these stakeholders groups.

Teachers were asked what they considered to be the positive aspects of virtual schools. Teachers felt that students would be afforded greater flexibility because they would be working independently, setting their own pace for completing assignments. In addition, students would be able to choose when they would work and would also have their own comfortable space. Another benefit of virtual schools would be taking advantage of technology as an educational opportunity. Students could take classes they would not be able to take otherwise.

A similar question was asked of an administrator, but was more specific to the school: What do you consider to be the pros for having virtual classes available to our students? The administrator noted that virtual classes would provide a wider array of advanced courses and a more diverse array of electives to complement and extend the students' interests. In addition, students would have an advantage by working through a different modality using new technology.

Students were also asked about the advantages of their school offering virtual classes. Ideas presented by the students included financial benefits; the school would not have to raise its budget but could offer new courses by connecting network mentors and offering a variety of topics to study. Students also mentioned that online classes could be used for students to pursue individual interests. If they are more interested in those classes, they would work even without a teacher present. Some middle school students said virtual classes would lessen the pressure to answer a question rapidly. They would not have to rush to give an answer. In addition, students mentioned the flexible scheduling that virtual classes would offer.

Although advantages mentioned by students were well-articulated, their responses to the next series of questions shed light on underlying perceptions. Students were asked if they ever have thought of taking an online course. Their responses were all negative. Their reasons were mainly the lack of interaction they feared if a teacher was not physically present. This lack of interaction included both with the teacher and with other students. After considering it longer, some students said they may take classes in the future.

These same concerns were raised by the teacher group when asked about virtual schools. Teachers felt the lack of physical presence of a teacher was detrimental to students and the learning process. There would be no way to hear other concerns. They felt that personal contact with a teacher is critical. They felt that it is important to look into the eyes of the students to really know if they are grasping the concept.

When asked about how students and teachers would communicate in virtual schools, the teachers mentioned the Internet, instant messaging, e-mail, blogging, and chat rooms. They felt it was very important to communicate at least once weekly. However, they felt communication

would be delayed and slow. If a student had a problem and needed help, academic or otherwise, they may have to wait for an answer instead of being able to speak with the teacher immediately.

In addition to the concerns regarding a lack of interaction, other fears mentioned were that teachers would no longer be necessary if the same courses were offered online, therefore affecting jobs. Finally, teachers were concerned that it would be easy to have someone else to do the work for you and still get credit.

The administrator said virtual schools are not used much in the northeast due to geographical and economic factors. Because of the rural nature in much of the south and west, school districts need to share teachers. Economically, in the south and west there are less people so the property tax base is lower. Therefore, the curricular offerings are less diverse. In addition, the administrator mentioned increased competition in urban and suburban schools. However, because the school in the case study is small, the tax base is lower than in many surrounding districts. By offering online classes, the school district could provide an enriched curriculum. Also, the cost to the school district to provide training to personnel would be minimal. It is a win-win situation for students and district, as well as teachers.

When asked about barriers in their district, the administrator said teacher anxiety about job security was evident. Teachers responded to the same question in a similar fashion, but added other cautions. First, resistance to change is an issue. Although it would be less of a problem for a select group, teachers and parents may be resistant because of a lack of personal contact. In addition, even though technology is available in the district, the daily set-up and coordination of virtual classes was mentioned as a potential problem. Finally, union issues are a priority in public schools; wanting to protect colleagues is always a consideration.

On a more positive note, when asked about potential opportunities, students responded that they would like to take courses currently not offered. Advanced placement courses, such as European history or psychology, were mentioned; as well as foreign languages. Taking classes they were interested in was a priority, especially ones they could study in greater depth in the future, such as business. In addition, courses more subjective and abstract in nature would allow them to expand their viewpoints. These may be literature, philosophy, and other liberal arts.

The interviews did not reveal many commonalities between stakeholder groups. There seems to be some lack of a knowledge base. Professional development and training could help diffuse this innovation more quickly.

A Factor-Analytic Study

Berge and Muilenburg (2001) conducted a study by first identifying factors that pose barriers to distance education in the K-12 educational arena. They examined individual case studies and reviewed pertinent literature. They identified factors common to the studies and then proceeded with an intense follow-up study of 2,504 respondents, including elementary, middle, and secondary schools. They concluded that

> The K-12 educators' concerns about distance education have much in common with issues that have been reported anecdotally in the literature: faculty compensation and increased time to design, develop, and implement teaching and learning within a technologically-mediated, distance environment; the effort needed for cultural or organizational change within the organization; the lack of technical expertise and support needed for the distance education efforts and the lack of access. (p. 4)

The results from the author's individual case study found all of the same concerns

regarding implementation. Union issues, job security, a paradigm shift, and the need for more technical expertise were also mentioned.

Recommendations for Educational Leadership

Bingham, Davis, and Moore (2006) have noted that "the future of distance learning technologies in education will be most influenced by the manner in which educational administrators handle the change process" (p. 7). Teaching and learning in a virtual atmosphere, whether for one class or an entire program, is a paradigm shift for the learning community. From students who will take classes to the taxpayers that authorize budgets, all stakeholder groups need to be addressed. This article addresses the area of professional development, but it does not discuss meetings that need to take place with community members, including parent-teacher organizations. Parents will eventually finance any new programs and will use the new programs. Identifying and understanding their concerns are the job of the educational leadership hoping to instill any lasting changes.

Administrators need to understand unique qualities of their schools and must include stakeholders at all levels of planning.

> School leaders at all levels must collaborate with staff members and school personnel to create a vision for the future and a process for change, ensuring that schools and school districts are viable and thriving learning communities for students, staff, and community members. (Valdez, p. 5, 2004)

Working with teacher committees, the administration determines professional development avenues for the school district. An administration that communicates with the teachers and listens to their concerns will be more apt to enact transformation in the school.

Professional Development

In their concluding statements, Muilenburg and Berge (2001) added: "One logical next step is to describe how to overcome these barriers now that we have identified which are of higher priority" (p. 4). In the small case study, teachers and students identified the lack of interaction in distance education as a significant barrier to virtual classes. Professional development activities should include demonstration of successful methods of facilitating student-to-student and student-to-teacher interaction in an online environment.

Another area of concern highlighted by teachers was job security. One way to overcome this fear is for the administration to work jointly with the unions to find ways to secure jobs and, at the same time, find ways to continue the quest for the inclusion of distance learning programs. This could be accomplished by ensuring students will not be allowed to enroll in any course already offered by the school district, and making virtual classes voluntary. One option for administrators and teachers to explore is that virtual classes could function as enrichment programs after school, for which teachers would be given stipends.

The Virtual High School offers professional development for teachers to learn how to create a unique virtual class or to teach one that has been previously offered. The prices are minimal for teacher professional development. Schools are allowed 30 seats per semester if one of their teachers leads a virtual class. Many of the teachers from the school in the small case study are familiar with virtual classes because they currently take professional development courses through organizations such as the Teacher Education Institute (TEI). Although none of the current course offerings are specific to teaching online virtual

classes, in the future there may be courses offered by TEI that specifically address these issues.

Professional development needs to be specific and applicable to teachers and their students. One old adage is, "If you don't use it, you lose it." Sitting in staff development sessions, having no intent to use what is learned, is simply a waste of district resources. Planning staff development sessions to produce a lasting change will create a noteworthy educational atmosphere for all stakeholders. Professional development needs to be ongoing, addressing issues of concern.

Conclusion

The search for commonality is required when trying to implement anything new. Due to the absence of any magnified commonality in the small school case study, there is an obvious lack of knowledge base. There is a need for staff development to allay fears and emphasize advantages. The administration should find ways to highlight the many opportunities virtual classes offer, while responding to concerns and barriers voiced by key stakeholders. Professional staff development is the method of choice. To make this an exciting time in education, the right steps need to be taken by all stakeholders involved. If a district wants to create a real learning community full of enthusiasm for learning and technology, the first steps must involve listening to the ideas and concerns of various stakeholder groups. Furthermore, planning for staff development and meetings with community members to highlight the advantages of taking virtual classes, while allaying fears, will enable innovations to diffuse more efficiently, in a method acceptable to all stakeholders.

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"Professional development needs to be specific and applicable to teachers and their students."

Online Distance Learning

The K-12 Student's Perspective

Susan Bedard and Beverly Knox-Pipes

Public education must adapt to a changing world by liberating educators and students from the traditional, industrial model. This model structures learning to a 6-hour day delivered within the confines of the classroom or school building. Today's students increasingly expect a learning experience that is relevant, authentic, and real. They require skills and knowledge that will enable success in a new world that is global, agile, and entrepreneurial. The question that is posed by education is: "Will they be ready?"

The K-12 community must recognize that the greatest change agents for fully integrating technology into schools are technology-savvy students. It has been reported that this generation of students spends more time on the Internet than watching television. The Internet is clearly their medium of choice for entertainment, information, and communication. As young people and their parents expect and demand more from their local schools, it will help bring about needed change.

Technology is a way of life for many of today's students. It is so interwoven into students' lives that the technology is transparent. As the result, individuals and institutions must keep pace with the rapid change in technology or risk viewing the

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world in a constant blur. Friedman (2005) alludes to the speed of change in his book, *The World is Flat: A Brief History of the Twenty First Century*. He says, "we are entering a phase where we are going to see the digitization, virtualization and automation of almost everything. The gains in productivity will be staggering for those countries, companies and individuals who can absorb the new technological tools." He goes on to point out, "whenever civilization has gone through one of these disruptive, dislocating technological revolutions—like Gutenberg's introduction of the printing press—the whole world has changed in profound ways".

Children are saying:

- Students rely on technology as an essential and preferred component of every aspect of their lives.
- Students are not just using technology differently today, but are approaching their lives and their daily activities differently because of technology.
- As students get older, their uses of technology become more sophisticated but, comparatively, the younger students are on a fast track to becoming greater technology users and advocates.
- The access point for technology use, particularly for older students, is home-focused, not school-focused.
- Today's students are ultracommunicators. (United States Department of Education, Office of Education Technology, 2004)

The community of K-12 education has seen significant growth over the last decade in distance learning programs, defined as learning experiences in which students and instructors are separated by space and/or time. The definition used by the United States Distance Learning Association (USDLA) is "the acquisition of knowledge and skills through mediated information and instruction, encompassing all technologies and other forms of learning at a distance," (USDLA, 2005). The key understanding is that teachers and learners exchange ideas and are guided through material. While elementary and secondary students have learned through the use of electronic distance learning systems since the 1930s (Bianchi, 2002), the development of K-12 online distance learning schools and programs is a relatively new phenomenon. E-learning (electronic learning) will ultimately change the very essence of learning and what it means to "attend school."

> I love my online schooling because it is so flexible. The UMOHS allows me to do my school work anywhere and anytime. I think that is great! I can work at my own pace. I have great communication with my teachers. I talk to them everyday. (University of Miami online high school student)

Online learning has the potential to overcome the challenges of time, distance, and economics. Satellite, microwave, cable, and broadcast TV first gave students access to courses not otherwise available in their home schools. More recently, multimedia Internet-based technologies have provided even more powerful options for teaching and learning at a distance. With virtually all schools now linked to the Internet, a growing number of states, districts, and individual schools are adopting online courses to expand their curricula.

> Studying through Monroe has been a wonderful experience. The online format suited me because I could keep my part-time job and complete my high school diploma simultaneously. I enjoyed the flexibility that it allowed me and I could access my classes 24/7 from anywhere in the world! Brilliant!… I have now enrolled at American Intercontinental University (AIU) to complete my associate degree in business administration. I am planning to major in human resource management. Many thanks. (Graduate of Monroe Virtual School, Wisconsin)

Online courses make sense. Not only do they expand the range of offerings to all students but they also are of significant interest to special populations such as homebound, incarcerated, and other non-traditional students.

> … has allowed me to pursue my skating goals, learn to fly and travel the world, all while completing my school work in a timely manner. Thank you for giving me a great education that let me get into top colleges. (Online student of Laurel Springs)

> For anyone pursuing a dream—whether competing in a sport, traveling or something else—I'd recommend Keystone. It allowed me to receive a great high school education while doing what I love. (Keystone National High School student from Washington)

Online distance learning may be ideally suited to meet the needs of those calling for school choice, high school reform, and workforce preparation in twenty-first century skills. The growth in the numbers of students learning online and the importance of online learning as a solution to educational challenges has prompted a closer look at the factors that affect student learning in virtual schooling environments.

> Laurel Springs School prepares seniors especially for college by putting their work into their hands. As a student of Laurel Springs, I learned how to teach myself and have enough discipline to complete all my assignments. In the end, I gained great confidence in my work and abilities. (Laurel Springs Virtual School student)

K–12 distance education is fundamentally unique. Being a student in an online environment requires new strategies for maximizing learning. Most researchers in the field have an abundance of data on adult learning using online programs, but relatively little is available on K-12. Learning online is a new experience for K-12 students; however, it is a way of learning that will increase in the future as more institutions of higher education, corporate organizations, and the K-12 community use the Internet for distance education. Learning how to be successful online and understanding this new way of learning is key to each student's success at any age. Although the research indicates that students can be successful in online high school courses when given the opportunity to learn the skills for success, there is still a significant amount of caution raised in the K-12 environment to be sure to design learning experiences that truly meet the needs of the younger student.

> I think it gets really tiring to follow the threads and add something too when the classes are too big, so I prefer smaller groups of five to six students. (Student of Florida Virtual High School)

> The teacher was a little bit too concentrated on the role of a facilitator … I would have loved to hear her personal opinions on the subject. (MVHS student)

> Interaction online was different than in a real world classroom in that thoughts were not spontaneous. At times, that can be a plus but sometimes spontaneity can be fun and refreshing. (MVHS student)

> Everything seems to take longer in a Web-based course including getting feedback from the teacher and peers. You must have a good level of patience, something which I sometimes struggle with. (Florida VHS student)

The National Educational Association's (NEA) research found that it is common knowledge that technology can help bridge educational gaps by removing geography and economics as barriers to high educational achievement for every child. It is important to help teachers and administrators in K-12 schools understand

how to integrate these rich online experiences into the K-12 environment and listen to the student's who are embracing this new way of learning.

> I really enjoyed my VHS course and I feel like I have had something that just isn't offered in other schools. It has helped me learn more about the world in which I live and is a great resource for the future. (Virtual High School student)

Today's challenge, however, is to ensure that information technology increases the quantity of educational opportunities while maintaining or enhancing the quality of those opportunities. It is particularly important that educators use tools of the information age—including online courses—to build information age skills and understandings.

> I enjoy reading the information on the computer and being able to see other pictures while I am reading. I also enjoy being able to work at my own pace as well as taking the tests when I am ready. This allows me to feel entirely ready to take the test and gives me the correct amount of study time for each. (Government Student, Lansing, MI, MVHS)

The growing experience and analysis of online learning are revealing that new forms of delivery require new quality criteria. Most of the educational standards for the delivery of instruction at the K-12 level never considered these new communications tools. Standards and methods that have been designed to instruct students in physical classrooms cannot simply be transferred to an online environment. Comparing the two settings and understanding the dynamics that are offered in each setting, however, helps to understand that online learning may suit certain populations of students who otherwise may not be successful in a traditional setting.

Physical classrooms offer an abundance of opportunity for face-to-face communication and student interaction. Students and teachers can have dynamic discussions, which feed the energy in the room. People watch each other, react, and listen to the side conversations that sometimes redirect the class. Physical classrooms can be exciting, fast paced, friendly, and places to find reassurance and support. However, physical classrooms often demand an outgoing personality and a person with high confidence in groups. While some students thrive in this environment, many students disappear into the back of the room and become silent observers. Reasons for this include: "I don't want to interrupt the instructor, I don't want to be laughed at for asking silly questions, I am not sure if I know the answer to the question," and so on.

In a traditional physical class, which meets for one or two 4-hour meetings per week or daily for 50 minutes, students may be unable to fully explore the wealth of topics offered because of the amount of communications taking place in a short time frame. In addition, the traditional passive educational process of lecture followed by question and answer does not serve to capitalize on the knowledge of a learner, nor does it offer other elements students prefer. When students are limited to the information that the instructor provides in traditional classes, it reduces the course's breadth and scope (Ko & Rossen, 2001, p. 105). In addition, passive students may simply select to refrain from involvement. It is easy for a passive persons to get by with saying very little in a physical classroom because they feel they have met their responsibilities by just being present. It is equally easy for them to feel alienated from the classroom community. Sometimes, this alienation comes from the individual's own desire to refrain from discussions and sometimes it comes because they feel they do not fit with the other students in the class.

> In VHS, a student doesn't have to be afraid of appearing "too intellectual"

(often associated with unpopularity) in front of your friends, or in front of other kids in school who might mock you. VHS allows students to voice their true opinions without having to censor themselves, because in VHS, you know that people take classes because they really care about them, and it's taken seriously. No one is going to make fun of you, and even if they do, chances are they live 10 states away. (Concord Virtual High School student)

Online education is an appropriate method of education for today, and a method preferred by many types of students, especially the passive communicator. The desire for online learning often stems from the sense of control the student gains. The student in an online world is a free agent able to make choices and direct his or her learning in order to gain the most (Rudestam & Schoenholtz, 2002). In the online classroom, passive, silent students are really not even present until they speak up and take action. Here, the old adage "out of sight, out of mind" is applied.

Learning online appeals to a wide variety of students who need to complete requirements for graduation, pursue special interests, and continue to participate in a home schooling environment. It also requires greater self-discipline but it can give the student more freedom to "attend" class at times that are more convenient. Being able to communicate effectively in written format is critical to success online as most of the work is text based. A benefit of online learning is the ability to review discussions and lectures multiple times thus increasing the student's ability to achieve course goals. Students are on a level playing field in online courses.

I would like to thank you for your wonderful Science course. Devon worked hard and learned so very much. She truly enjoyed it. I am certain she would not have received the same knowledge, experience or confidence in a "traditional" school setting. Thank you. We will be in touch again in the fall. (Parent, Kitchener Virtual School, Canada)

It takes a lot of time to write all responses clearly and to read everyone's interactions. But you get more from written interaction than from face-to-face interaction. You have time to think deeply before responding, which is different in face-to-face classes. You learn together as one large group in online classes, where as in face-to-face classes the instructor is more the giver of information and the students just sit and listen to lecture. (Illinois virtual high school student)

Online learners must be involved to be present in the class; therefore, they are more inclined to become involved in discussions. The online environment also offers learners the ability to work as collaborative partners in the learning process due to the nature of the online discussions and the sense of equality that occurs with the absence of visual and verbal cues (Rudestam & Schoenholtz, 2002).

Secondary, students typically live very busy lives filled with commitments at work, in school, social, family, and more. The asynchronous delivery of online courses presents a myriad of advantages to very busy life styles as students can go to class any time and from any place as long as they have Internet access. The online classroom also provides for a longer time to explore topics, as well as for more in-depth discussions. Therefore, the online mode of education further answers the needs of active students in that the courses allow them to continue their lifestyle with only minor adjustments.

The many thousands of K-12 students who participate in online education programs are attracted to virtual schooling or online learning because it offers advantages over classroom-based programs. Among the benefits of distance education for school-age children are broader educational opportunities for students who are

unable to attend traditional schools, access to resources and instructors not locally available, and increases in student-teacher communication.

"Evidence to date convincingly demonstrates that, when used appropriately, electronically delivered education—'e-learning'—can improve how students learn, can improve what students learn, and can deliver high-quality learning opportunities to all children" (National Association of State Boards of Education, 2001, p. 4). Students in virtual schools or online programs have shown greater improvement than their conventional school counterparts in critical thinking, researching, using computers, learning independently, problem-solving, creative thinking, decision-making, and time management (Barker & Wendel, 2001).

A primary characteristic that sets successful distance learners apart from their classroom-based counterparts is their autonomy (Keegan, 1996) and greater student responsibility (Wedemeyer, 1981). Virtual school teachers must be adept at helping children acquire the skills of autonomous learning, including self-regulation. Adults have almost perfected this, but younger students are novices and need guidance. This distinction is important because experts organize and interpret information very differently from novices, and these differences affect learners' abilities to remember and solve problems (Bransford, Brown, & Cocking, 1999), and their ability to learn independently.

A second characteristic that differentiates successful distance learners from unsuccessful ones is an internal motivation, leading them to persist in the educational endeavors. Research has found that older students have more internal motivation than younger students (Gershaw, 1989), reinforcing the need for careful design and teaching of distance education at K-12 levels. Younger students will need more supervision, fewer and simpler instructions, and a more extensive reinforcement system than older students. Effective online programs for young learners include frequent teacher contact with students and parents, lessons divided into short segments, mastery sequences so student progress can grow in stages, and rewards for learning such as multimedia praise and printable stickers or certificates.

> Electronic conferencing is great. I love to read other classmates' responses to assignments. I think discussion about assignments is a great learning opportunity. This is what makes online classes better than onsite classes. (Florida Virtual High School student)

Students will continue to choose distance education and particularly Web-based learning for a variety of reasons: geography, work conflicts, family obligations, health, ease of participation, climate/weather, and opportunity. Although some students report that they prefer to study at a distance, most do so because it is the option that fits most easily into an already busy life. Testimonials written by participants in distance education express student satisfaction with the method despite some hurdles they must overcome. Some state that the difficulties they have to overcome online made them concentrate more, work harder, and learn more. Clearly, distance education via the web offers benefits that make the obstacles worth scaling (Mood, 1995).

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"ELECTRONIC CONFERENCING IS GREAT. I LOVE TO READ OTHER CLASSMATES' RESPONSES TO ASSIGNMENTS. I THINK DISCUSSION ABOUT ASSIGNMENTS IS A GREAT LEARNING OPPORTUNITY. THIS IS WHAT MAKES ONLINE CLASSES BETTER THAN ONSITE CLASSES." (FLORIDA VIRTUAL HIGH SCHOOL STUDENT)

Instructional Performance Management System

Streamlining Instructional Management for Success

Shirley Johnson and Steve Busch

Since the adoption of No Child Left Behind (NCLB), administrators throughout the United States have become interested in software packages that assist campus administrators in managing tasks related to disaggregating data, managing curriculum, monitoring student progress, and other important instructional processes. Before NCLB, the need to technologically manage the tasks was evident, but it was certainly not in demand. Installing such software carried a number of risks that administrators were not willing to embrace, namely, (a) spending money to purchase hardware to support an elaborate software product, (b) finding ways to convince faculty and administration that such programs are worth the time and effort both to learn the software and then use it successfully, (c) knowing for sure that the software will be beneficial and not produce additional work that

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could be adverted by continuing to use existing systems (d) and, having research to support that the use of an instructional management software will produce improved student achievement.

Little has been written about instructional management systems that are all-inclusive of the curricular and instructional tasks necessary to provide comprehensive information to assist teachers and administrators in providing effective instruction, assessment and student tracking strategies. Software companies within the past 3 to 4 years have developed varying combinations of applications, but few have the comprehensive components that effectively support improved student performance. Various districts have implemented individual packages that complete several of the tasks, but most do not have totally integrated systems featuring user-friendly applications to support teaching rather than drive it. The purpose of this article is to provide an overview of a system available to school districts that contains important component parts to assist in improving instruction. The detailed descriptions are courtesy of Cambridge Knowledge Systems, Incorporated, in Houston, Texas and reflect their current software.

An instructional performance management system that benefits schools in the management of curriculum, instruction, and assessment must possess the following components in order to provide a complete and integrated system. The software must be user-friendly, opening to an access screen listing primary tools that include: a student monitoring process, a lesson planner, resource files, and assessment tools, including a benchmarking system. All of the components parts must be integrated seamlessly so that the teacher is able to plan instruction based on the current progress of the students, have access to quality resources for creating the plan, and organize assessment that effectively matches what is taught. The following provides a brief introduction of the component parts of the system.

Personal Graduation Planner

A remarkable feature in the Cambridge IPMS software that is not readily available in other software management systems is the capacity to manage the progress of a given student from an identified grade through graduation. This signature component illuminates the underlying philosophy of a student-centered system. Starting in middle school or even in kindergarten, counselors, administrators, and teachers can manage the progress of a student through the selection and completion of the courses each student has selected for graduation. This primary database system receives all of the results of achievement tests, benchmarks, and course grades, and compiles them in a student's individual planner. The counselor can then carefully follow each student's progress without managing folders of paperwork tucked into several file cabinets.

The significant feature of this program allows counselors and administrators to follow the progress of at-risk students who are failing or who are at risk of failing courses. The speed and accessibility of the software enable counselors and administrators to manage a student's file by not only tracking progress, but also by creating an individual growth plan that is driven by goals created in conjunction with the teacher, the student, and his or her parents. The narrative section of the student's file features the incremental notations by the counselor that track progress toward goals and any other important information that would benefit teachers and administrators as they work with the student. Even though the design of this program was intended to assist with the at-risk student, the features of the program benefit all students.

Included in this program is also a data sort capacity that allows the manipulation

of test data to determine student achievement by teacher, by student, by course, and by any other data point that is loaded into the program. Principals are able to quickly compare the results of teachers' impact on given students by identifying the variable comparisons and analyzing the results. The effect of these data is immeasurable when each teacher views the impact of their instruction and each department determines the alignment of their scope and sequence.

Lesson Planner

The lesson planner provides an organizing shell into which the teacher creates the lessons to be taught for each class for the entire year. Four components comprise the planner: (a) standards selection, (b) objective selection or development, (c) activities, and (d) modifications. A calendar management system allows the teacher to immediately access a lesson anywhere in the sequence of the course or make any appropriate changes in the course sequence or content as necessary. Each school district has the option to customize the planner, but most require very similar components.

The first component of the planner requires the selection of state standards used to align lessons. The IPMS allows the teacher to select applicable standards and "drag and drop" the standard (objective) into the correct section of the planner. The teacher is now able to track the numbers of times a standard has been addressed during instruction as well as assist in continuing alignment throughout the planning process.

Within the next component, an objective can be written further delineating the intent of the standard(s) by breaking down the cognition and content requirements of the state standards. If the teacher chooses or is required by the district or principal, he or she can select prewritten objectives from a district-approved or campus-developed scope and sequence that can be "dragged and dropped" into the objective section.

In the modifications section of the planner, teachers provide specific modifications for students that receive special education and/or English as a second language instruction. This also serves as a valuable tracking tool for the teacher to reference in the students' individual education plan (IEP).

The planner, in many ways, provides very traditional lesson design components; however, the online capabilities of the IPMS enables the teacher to electronically file all plans, readily access them, duplicate plans for self or other teachers, and archive courses for future usage. An additional feature allows the principal to have "back side" view of each teacher's lessons while providing immediate access to lessons for clinical supervision observations, alignment checks, approval processes, or any other procedures that a principal or dean of instruction deems necessary. All a principal need do is identify a particular day to observe, find the lesson, print it, and then go to the classroom for observation. The "back side" capability allows the principal to also view how a teacher develops a unit or series of lessons that address particular standards. Consequently, the principal has a better idea of the teacher's planning skills in relation to the cognition and knowledge expectations stated in the standards. The planner and its features enable principals to quickly assess difficulties in the early days of instructional delivery and initiate interventions before there are significant problems.

The major objection to the IPMS is the immediate visibility and accountability of the lesson planning process. Notoriously, teachers detest planning lessons for review by one administrator. The tradition of planning in schools is usually day-by-day-and sometimes by the moment. Requiring electronic planning that can be administratively or peer reviewed adds a degree of unaccustomed accountability not usually

welcomed by faculty. Under the traditional system, lesson plans submitted are not always those the teachers use to guide instruction, but are those used to meet administrative requirements. This process is difficult for both the principal and the teacher because the goal is not quality lesson planning but one of "keeping the principal happy" by turning in lesson plans regardless of the quality.

When instructional difficulties emerge, principals frequently look at lesson plans to determine possible evidence of the problem; however, it is difficult to determine the source in lesson plans unless there is some continuity and alignment integrated into the plans. Principals become troubled when the instruction does not match the objective; teachers are distressed because the lesson plans are a perfunctory duty; and, the entire process fails to impact student achievement in any significant way. Under these circumstances, the lesson planning process is not "win-win," and contributes little to the success of students.

In the paper copy system, time becomes a driving force because administrators simply cannot handle the volume of lesson plans nor easily track any required changes. When conferences are required to determine students' progress, locating instructional delivery problems in the paper system creates a formidable obstacle. Moving lesson planning requirements to an electronic system accomplishes several things: (a) standardized planning expectations, (b) increased attention to cognition and knowledge requirements stated in standards and developed in daily lessons, (c) required clarification of learning expectations for both teachers and students, (d) mandatory creation of relevant activities that develop the intended cognition and knowledge, and (d) minimized hard copy management.

Resource File

Important to planning are the host of resources available to teachers that assist in creating interesting plans that engage students. In the IPMS resource file, teachers have immediate access to online resource files of material and instructional assistance that would consume large shelving units in regular classrooms. Online availability allows the teacher to conduct searches quickly locating materials that can be added to the lesson plan. Such a process managed manually would take much more time and would be available in hard copy only. Obviously, materials are just the beginning of the possible resources that can be uploaded into the resource file of the IPMS.

Other resources that can be available to teachers might be all district curriculum documents, district and/or building scope and sequences, state and national standards, materials that accompany a textbook adoption, teacher-developed materials, URL listings that match content or state standards, and much more. The resource file literally can be conceived as a series of large file cabinets containing all of the valuable resources that teachers use to plan lessons. Each content area will have the same resource file that contains all of the above at least, and probably more.

Even though viewed as a wonderful tool, teachers must think differently as they search and use various resources. Traditionally, these materials were stored in file cabinets, storage attics, and in countless other locations. Remembering their locations and how to access them was always a challenge. The IPMS resource file assists in reducing the trauma associated with tracking important instructional materials and tightly organizes the wealth of material important to teachers. It is difficult to imagine that many black line masters, activities, DVDs, and other resources can be stored in software and accessed in lightening speed. Given the opportunity, teachers are excited to sit at the computer and

find everything they need for planning through a few key strokes. Teachers also realize that culling aging materials is quickly done as well.

Entry of key resources is done by central office personnel or can be loaded by the software company; however, most software companies can create entry access at the school site so that resources important to each school can be added to the resource file.

Assessment Tools

Critical to English's (2001) concept of the written, taught, and tested curriculum is teachers' ability to assess what they have taught. The software provides teachers immediate access to an assessment package containing a test item bank from which tests can be created that are aligned with local and state standards, and/or teacher assistance in writing additional items, using a wizard. Once the test is written, the assessment can be delivered online for student completion or printed to score with a scantron answer sheet. If the teacher chooses and has access to online test administration, answers can be scored within seconds and the data disaggregated instantaneously by any set of variables desired. The primary philosophy on which this software is designed assumes that this entire set of assessment tools is used to assist the teacher in improving his or her instructional delivery. This is not a set of tools designed to determine how a student has failed, but how instruction can be improved.

This assessment feature also has a number of reports that provide a variety of ways to analyze data through any of the following variables: (a) socioeconomic status, (b) gender, (c) grade, (d) teacher, (e) objective, (f) answer detractor, and many others. These rich analyses provide different views of how well the students achieved and how well teachers taught (Hoyle, English, & Steffy, 1998). In the past, these data have been provided by the central office through software management programs that were not readily available to teachers or very user friendly. The IPMS provides immediate, teacher-friendly data management that is invaluable for improved instruction.

The assessment tools also allow development of benchmark tests to determine student progress toward standards achievement. The software provides various levels of access for teachers, administrators, and/or district personnel in order to increase the ease and facilitation of assessing. Teachers, for example, are provided a test bank from which they can select items that are aligned with the state standards and the district scope and sequence. The alignment increases the ease with which a teacher can make appropriate item selections and be assured that the assessment is relevant. In practice, the teacher should have taught all of the objectives relevant to the unit or module, allowing a determination as to the success of the strategies and instruction included in his or her lesson plans. All teachers have access to create and use classroom level assessments, coupled with the choice to share a complete test or selected items with other professionals.

Teachers are also afforded the opportunity to create their own assessment questions through the test item wizard available in the software. The wizard simply assists the teacher in the writing of the item stem and in the development of the detractors and the correct answer. Of course, the wizard does not assess the content of the stem or answers; it only guides the teacher in the development of each item in the format of the test. The wizard guides the usage of charts, pictures, and even video clips for any or all of the items. Once the items are created, the teacher may file the test for later usage or revision.

Building-level administrators may have another level of access that enables the development of a campus-specific test

designed to assess specific subjects. Teachers may not have access to these tests until they are given; however, the results of the test can be downloaded to each teacher and the results disaggregated by numerous variables. Since the design and administration of the test are or can be, if facilities allow, all completed online, the speed with which a teacher can receive his or her results is almost immediate. Also available is the ability for central level administrators to create and maintain a district-level benchmark or assessment that can be administered periodically throughout the year to determine district-wide progress.

IPMS Implementation

As wonderful as the IPMS may sound, implementation in schools and districts has been slow. There are a number of reasons as to why software of this kind has had a slow start. One would believe that schools would be quick to select such software and use it to improve instruction. The following provides a brief look at the problems associated with viewing IPMS as a system and beginning implementation.

An obvious problem for schools and districts is the availability of the appropriate hardware. Most schools have a computer in each teacher's room, but few schools have computers available for student use where software-generated assessments could be administered online. Cambridge has solved this problem for schools by providing an interface with scantron scanners that will upload the results of any administration. Again, after the upload, all data are immediately available for disaggregation in any way the teacher or administrator chooses.

Understanding the systemic nature of the IPMS has been an interesting challenge for software builders and progressive administrators. The system, as mentioned before, provides a seamless integration of a number of tools that assist educators in improving student achievement. However, Cambridge, (R. White, personal communication, February 20, 2005) has met resistance based on a lack of understanding regarding the systemic nature of the IPMS. They have met with central administrators who quickly find the assessment tools very attractive because of the capacity to benchmark student progress and record district-wide results. Cambridge has also found building administrators attracted to the same assessment tools for similar reasons. However, neither central nor campus-level administrators see the total benefit of the integrated features. Cambridge found principals a little wary of requiring teachers to create their lesson plans online for several reasons (M. Jones, personal communication, March 14, 2005). First and foremost, principals have experienced such difficulty in monitoring the requirement for teachers to turn in lesson plans that they find themselves simply receiving the plans and asking the clerks to file them often without ever looking at the product. Secondly, principals have experienced disasters in using early lesson planning software products that were either so cumbersome that teachers could not use them or they required so many details that teachers spent an inordinate amount of time completing the plans. As a result, principals have become a little hesitant to risk using another lesson planning product.

Principals quickly saw the benefit of using the assessment tools because it would speed the return of data to the teachers and prevent them from spending time creating paper assessments for administration. Interestingly, principals could not see the benefit of loading either a district scope and sequence or a building-developed sequence of state standards. Cambridge found that principals could verbalize the relationship of a scope and sequence to testing, but did not indicate that the sequence had much use for teachers. It was not ascertained if the principals simply did not understand the relationship

of the scope and sequence to testing or if they were not willing to ask teachers to use the sequence over the traditional sequence of content offered in various textbooks.

The integrated availability of the resource file to teachers was somewhat more attractive to building-level administrators than were the scope and sequence documents. A careful review of the administrators' comments revealed that they, like so many of their teacher counterparts, plan by activity rather than by objective. Principals found it helpful to provide teachers access to as many resources to create lessons as possible, but did not necessarily see the immediate connection between the scope and sequence files to the lesson resources. This certainly is not an indictment of principals or teachers, but it does point to the serious lack of understanding regarding scope and sequence, teaching, and lesson planning (English, 2001).

Benefits of the IPMS

The evident benefits of the IPMS are numerous and, as the software is used and expanded, more benefits will emerge to make it an invaluable set of tools. It is clear that there is a learning curve associated with this set of tools, but the benefits will clearly outweigh the struggle.

Most accountability measures are initiated by central administration and monitored by that same group. This is often intimidating to teachers because there is not a clear understanding as to how the data will be used or what will happen to teachers as a result. Implementing the system in-school brings the tools to the teacher, allowing each of them to analyze student data privately and design interventions quickly. Waiting for the district-level benchmark results decreases intervention strategies by several days, if not weeks. Having immediate analysis capacity increases intervention opportunities and subsequent learning. Teachers and principals do not fear accountability as long as they understand the rules and have an opportunity to make necessary changes. Having an in-school system at the fingertips of teachers has been a help in shifting instructional mentality from teacher-led to student-led because the entire process is focused on what the student will be able to do and what the teacher can do to improve the probability of student learning.

For states such as Texas, the accountability process has been in effect for approximately 25 years. Before the development of software designed to manage data, developing, distributing, grading, and analyzing benchmark results was tedious and time-consuming (K. Kasper, personal communication, November 12, 2000). Teachers were required to hand-grade the test, enter results in grids, and disaggregate the data by hand if further analysis was to be conducted. The IPMS will immediately disaggregate the data in any manner chosen by the teacher and report the results in a variety of reports that enable effective decision-making.

Lesson plans are difficult for teachers, due to their lack of understanding of the purpose of planning and/or how to write effective plans. Well-designed plans enable a principal to follow a carefully-constructed instructional design describing both the cognition and knowledge intended for the students. Most lesson plans are sparse representations of the intended activities, joined together in a somewhat fragmented weekly frame.

Teachers often create benchmark tests by cutting and pasting test items from booklets prepared by various vendors. With the IPMS, teachers no longer have to create paper copy tests since they now have the choice of creating the online tests for students to answer directly online or print the test for students to answer on a scantron answer sheet.

However, Kasper (personal communication, November 12, 2000) related that the resistance to the accountability of analyz-

ing their students' results was high, but the confrontation with the assessment results changed how teachers viewed their instruction. No longer could they blame "other" things or the students because the assessment results were immediately evident. Kasper (personal communication, November 12, 2000) described her new responsibility of facilitating teachers' analysis of their own work and supporting them as they journeyed from teacher-centered instruction to student-centered instruction was foundational to improved student achievement.

IPMS Challenges

Gaining acceptance has been the most formidable challenge to date; however, there are several things that are prepared for development and design. First among those is the software to support authentic assessment that is totally integrated into the current features of the IPMS. Cambridge is aware that purchasing a program and "patching" it into the current IPMS software can be doomed for difficulty and possible failure. Cambridge is committed to developing the software within the same architecture and appropriately integrating the authentic assessment components. Providing real-time professional development is another component ready for implementation that will support the instructional strategies identified by instructional administrators to assist teachers in the improvement of instructional delivery. Again, maintaining that feature within the architecture is extremely important. Last is the development of quality administrative coaching tools to assist principals and teachers in the journey to improve instruction using the IPMS tools and organizational development techniques. Many of techniques cannot be added to the IPMS, but they are critical to improved student achievement.

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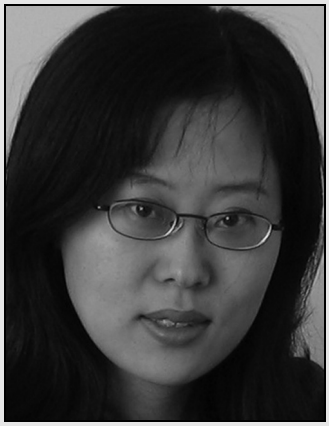
"An instructional performance management system that benefits schools in the management of curriculum, instruction, and assessment must possess the following components in order to provide a complete and integrated system."

What Students Do When Chat, E-mail, and Discussion Forum Are Available at the Same Time

Xiaojing Kou

Introduction and Purpose of the Study

There is one important component in distance graduate courses, especially social science courses: students (and instructor) discourses in the form of individual postings or group discussion. There have been a number of studies focused on discourses in distance courses. Most of them have focused on pedagogical or social issues (e.g., Fahy, 2002; Garrison, Anderson, & Archer, 2001; Hara, Bonk & Angeli, 2000; Henri, 1992; Zhu, 1996). Few studies have explored media usage in detail. In addition, the mode of communication studied is often predetermined and of a single type. Even research on computer mediate communication has often emphasized "holding the CMC mode constant, while varying the purpose of communication within that mode" (Herring & Nix, 1997). One characteristic of this research is to hold the purpose of the communication constant—a team project in distance education courses, while varying the mode of communication—e-mail, chat, and discussion forum. This study thus explores situations in which multiple computer-mediated communication modes are available and when students have freedom to choose modes as they see appropriate. The author starts from reading and interpreting students discourse and then looks for general patterns of usage under different mode of communication chosen by students. Through these efforts, the author aims to not only understand the diversity and focus of students activities as expressed and shown from discourses, but also interprets the choice and usage of communication media.



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Research Question

The author aims to answer the following question: When do students use which kind of communication mode to perform what kind of activities when multiple modes of communication are available to them at the same time?

Theoretical framework

The author of this study takes the perspective of a distance educator but mainly applies the theory of speech act analysis as the analytical tool. Due to this interdisciplinary effort, there are multiple theories that contribute to this study.

First, in terms of analytical tools and research methodologies, this study refers to speech act theory mainly used in discourse analysis. Early in 1962, Austin introduced the concept of performative verbs and pointed out that words can DO things. In his book *How to Do Things With Words*, he listed five types of perfomative verbs: verdictives, exercitives, commissives, behavitives, and expositives. A philosopher of language, Searl (1969), expanded and criticized the work of Austin. More recently there have been taxonomies such as that of Francis and Hunston (1992). Herring (1996) studied two distribution lists and gender differences in terms of speech acts. Herring and Nix (1997) studied Internet relay chat. They adopted Francis and Hunston's (1992) category. This study is more influenced by Fraser's taxonomy as introduced in McLaughlin (1984). Fraser emphasized the illocutionary act—which is intention of the speaker. He assigned performative verbs into eight categories: asserting, evaluating, reflecting speaker attitude, stipulating, exercising of authority and committing. Compared to other categories, Fraser's taxonomy is more suitable for analyzing argumentative discourse, whose style is closer to that of academic discussion in the education setting.

Also related to discourse analysis but in the field of education, studies that this study refers to are examinations of classroom discourse. However, these studies are predominantly on student-instructor interaction instead of student-student interaction, which is the case in this study. A very influential study in classroom discourse was done by Sinclair and Coulthard (1975). The basic pattern of IRF (Initiation-Response-Follow-up) has been adopted by many other researchers to study classroom discourse.

Second, in terms of the pedagogical and social issues, knowledge building is considered as critical to learning and is much related to this study. MacKinnon (2000) applied a taxonomy of discourse to students' online discussion as the basis of grading student performance. He assigned higher scores to categories of postings that are considered showing higher order critical thinking skills such as compare, contrast, idea to example, example to idea, clarification, elaboration and lower scores to messages considered of relatively lower order thinking skills such as only acknowledging or asking question. There are also other studies focused on a variety of issues such as cooperative learning (Harasim, Calvert, & Groeneboer, 1997), social presence and cognitive presence (Garrison, Anderson, & Archer, 1999), and so forth.

Methodology

The Data and Sample

The data come from archived student team communication in a graduate level distance course. A course management system is used. This system provides discussion forum, chat, and course e-mail. Students have freedom to choose any or all of the communication modes. All three types of communication are archived. In order to help students understand theories, a series of problem-based team assignments were given. Students formed into small groups of three or four to solve these problems or fulfill the task together. Two of the teams were chosen for the purpose of

Table 1
Team Information

		Blue Team	Green Team
Email	# Messages	19	34
	# Words	1,539	3,372
	# Speech-act unit	119	258
Chat	# Messages	75	526
	# Words	852	9,728
	# Speech-act unit	123	863
	# Times	1 time (37 minutes)	4 times (1 h 34 min, 1 h 40 min, 1 h 11 min, 1 h 21 min)
Forum	# Messages	68	15
	# Words	6,237	2,749
	# Speech-act unit	408	149
Total words		8,628	15,849
Task		Debate the validity of an instructional theory. The team together carries out a debate on the pros and cons of the theory and should finally synthesize the conclusions of the debate.	To think of an instructional goal that has, in the learner's experience, been particularly difficult for learners to grasp. The group together suggests how to use principles of meaningful learning help design effective instruction for this situation.

this research. Both use all three types of communication modes. Both teams earned a grade of A for the project. Table 1 shows the detailed information of the two teams chosen.

Data Collection

The data were collected by another researcher (Paulus, 2003) in a distance education course. Students' informed consent was given, allowing another researcher to make use of the data. All data are sanitized.

Data Analysis

There are three analytical devices. The first one is a simple time stamp analysis. The major analysis uses speech act analysis and general themes analysis.

Time Stamp Analysis: Time stamps are available for each mode of communication archived. Phases of discussion will be graphed to look for possible patterns.

Speech Acts Analysis and General Themes Analysis: The basic unit of analysis is called "speech act unit." The criteria for deciding a unit is to see if it performs a separate act intended by the speaker (illocutionary). The samples are divided into speech act units and each unit is assigned a speech act. Based on a pilot study of speech acts of 100 units in the sample, the author designs the following coding scheme revised from Fraser's taxonomy.

In addition to speech act analysis, the author further makes general themes analysis. Different from speech act analysis which looks at individual activities, general themes are designed to show the general "content" and "theme" of conversation. The following is the coding scheme for the general themes revised from Paulus' "Topic Categories" (2003).

Table 2
Speech Acts Coding Scheme Definition and Examples

Assert: State what message sender knows, observes or believes. "Assert" actions are done on the sender's initiative. When the sender provides information, describes…upon the request of other teammates, they belong to the "reply" category.	**Notify assertion in advance:** The message sender notifies in advance that some information or ideas will be provided. **Inform:** Provide information usually based on creditable sources. It can include whole or part of an article, abstracts, references, URLs (to resources), or paraphrases, summaries of articles, books, instructor's words, information about assignments, or other resources. They are usually facts or other people's ideas. It also includes the sender's personal information. **Describe:** Describe phenomenon, state, process, results, events or other people. "Describe" is to give a clearer picture Usually these events or phenomenon are not long lasting. **Report:** Report past actions, usually those of the message sender, but not limited to it. **Predict/expect:** The message sender predicts or expects a future state or event. **Restate (self):** The sender restates one's own statement in order to emphasize or clarify. **Claim:** Express (certain or uncertain) ideas, believes or preferences about the subject matter discussed, the task or external resources. Interpret external resources. Evaluate one's own previous statements or work. It exists in the form of statements or drafts and submitted assignments (can be pasted, attached, or put in a personal www account).
Hope: Hope something (team project related) good will happen.	
Suggest: The sender makes a proposal concerning either subject matter of the discussion or the task at hand. It suggests what the whole team could do.	
Express Emotion: Express personal emotions such as sadness, happiness, enjoy, anger, frustration…	**Express-positive:** express positive emotions such as happiness, enjoy. Emoticons and paralinguistic cues that express happiness can be included. **Express-negative:** Express negative emotion such as anger, frustration…Emoticons and paralinguistic cues that express these feelings can be included. **Express-neutral:** State with a strong feeling; Express surprise; Exclaim.
Commit: Commit to an action, usually a task-oriented action in a team project.	
Restate (Other): repeat or paraphrase other teammate's previous statements.	
Acknowledge: to acknowledge receipt of other teammate's message.	
Socialize: Open/close a conversation, pay/maintain positive and negative face, lose one's own face for group benefit, be modest, show concern/ sympathy/understanding/ humor…	
Evaluate/ Express Attitude: Agree/disagree or qualify/assess a previous statement, done on the sender's initiative.	**Evaluate-positive/agree:** Positively evaluate a previous statement; accept a previous statement. **Evaluate-negative/disagree:** Negatively evaluate a previous statement; disagree with a previous statement. **Other Remark:** Not clearly show agreement/disagreement. Look at the discussed idea from a new perspective; add additional ideas.
Inquire: Requesting originates from speaker but elicits information or ideas or just yes/no answer from the message receiver.	
Reply: the sender responds to the "inquire" act.	
Request Action: Ask others to do something. Can be direct or very polite. Can be a difficult or an easy task. It is addressed to an individual.	
Respond to request action	**Accept**: Accept the request for action. **Decline**: refuse the request for action.

Table 3
General Themes Coding Scheme Definition and Examples

Social: Speech acts that aim to maintain a good relationship or a team spirit. Include *socialize,* a very general *evaluate positive* that does not address a particular point in the discussion, and any other speech acts that talk about personal life instead of the discussion focus.	
Central content of Conversation: Talk about the subject matter of the project/ assignment	**Clarify Assignment Issues/Discussion Focus:** Talk about understandings of the expectation of the instructor: what is the assignment about, what should be the focus.
	Theory Building: Paraphrase, summarize a theory or concept; State one's belief/ understanding (claim) of a theory/concept; Use a theory/concept to explain phenomenon; Use examples to explain a theory/concept. Drafts or submitted assignments in any forms are counted as theory building.
	Content: Any other speech acts that address the assignment/discussion topic related content. It can be discussion on focus or structure of the final delivery.
Logistics: Talk about team process, such as when to meet, when to submit the report … (Talks about modes of communication will be counted separately).	
Technical: Any speech acts that address the technical issues in the communication.	
Communication: Any speech acts that discuss choice or preference for modes of communication. (It can be part of Logistics, but are counted separately in this category.)	

Results

Time Stamp Analysis Result

Based on the time stamps, the two teams' postings are represented by the pattern's in Figures 1 and 2.

Speech Act Analysis and General Theme Analysis Result

Results for the Whole Process

Frequency of each speech act as and frequency of each general theme are counted for each of the three modes for each of the two teams separately. Tables 4 and 5 show a summary for each team and each mode the top three most frequent speech acts, and the top three most frequent general themes.

Cross Phases Findings

Frequencies of each speech act and general theme for each mode and teams are further counted in terms of the three phases as shown in Figure 1 and Figure 2. These results are summarized in Tables 6-11.

Conclusion

Conclusion 1: Medium choice and usage vary over time. Time stamp analysis shows both teams presented similar patterns—E-mail use spanned from the first day to the last day of discussion, with intensive use on the two ends of the project and with much less frequency in the middle of the project. Discussion forum was rather heavily used in the middle, though there is team difference. Blue team used a lot of discussion forum and used chat less. Green team heavily used chat instead of forum. Three broad phases are thus identified. This result adds another dimension to the study: how phase of discussion interacts with acts, themes, and medium.

Conclusion 2: The general themes vary over phases. However, one persistent theme is "logistics." Communication tools that aim to facilitate student collaboration should be designed to facilitate team logistics. To look across the phases, it is found that Phase I and Phase III have more social and logistics themes. Students establish relationship in Phase I. They confirm and appreciate the relationship in the final phase. They also establish team norms and decide working

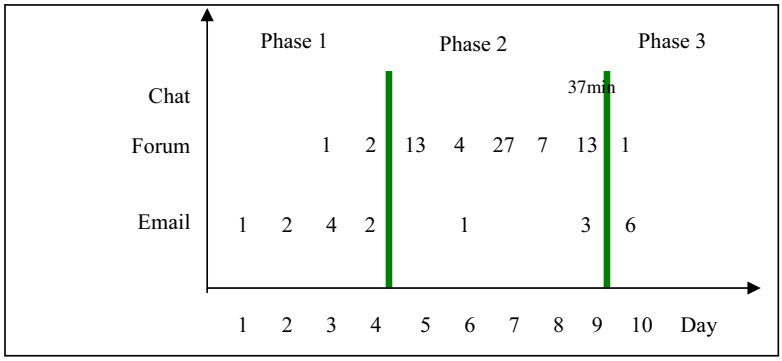

Figure 1. Green team result.

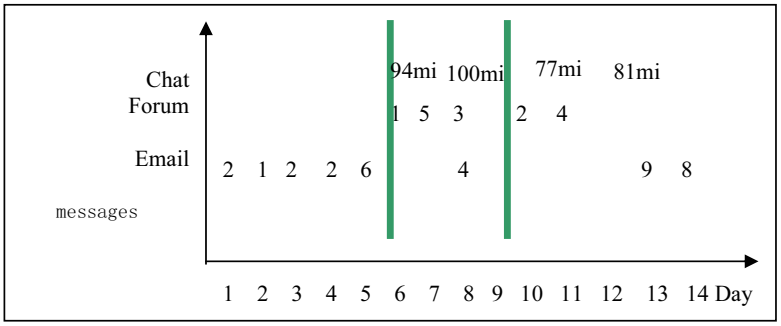

Figure 2. Blue team result.

Table 4
Top 3 Speech Acts

	Chat (%)		Email (%)		Forum (%)	
Blue Team	1. socialize	17	1. report	16.8	1. claim	35.8
	2. inquire	11.4	2. socialize	14.4	2. inform	15.9
	3. *commit/report*	9.8	3. claim	12.6	3. report	10.1
Green Team	1. inquire	18.9	1. claim	19.8	1. inform	38.9
	2. *claim*	17.6	2. report	16.7	2. claim	22.2
	3. socialize	8	3. socialize	15.9	3. report	10.1

Table 5
Top 3 General Themes

	Chat (%)		Email (%)		Forum (%)	
Blue Team	1. social	47.2	1. logistics	42.8	1. theory building	66.2
	2. logistics	29.3	2. social	24.4	2. content	15.9
	3. content	17.9	3. content	21	3. logistics	10.5
Green Team	1. content	46.5	1. content	39.9	1. theory building	58.4
	2. social	18.3	2. logistics	26.3	2. content	30.9
	3. theory building	17.7	3. social	23.2	3. logistics	6.7

Table 6
Chat—Top 3 Speech Acts in Phases

	Phase I	Phase II (%)		Phase III (%)	
Blue Team		1. socialize	17		
		2. inquire/commit	11.4		
		3. report	9.8		
Green Team		1. inquire	20.4	1. claim	23.7
		2. claim	13.5	2. inquire	16.9
		3. report	12	3. socialize/ evaluate+	9.1

Table 7
E-mail—Top 3 Speech Acts in Phases

	Phase I (%)		Phase II (%)		Phase III (%)	
Blue Team	1. report	16.9	1. claim	28.6	1. report	23.1
	2. suggest /socialize	13.6	2. suggest	19	2. socialize	15.5
			3. socialize	14.4	3. commit/inquire	10.3
Green Team	1. claim	17.1	1. socialize	30.7	1. claim	22.9
	2. socialize	16.3	2. notify/ inform/		2. report	20
	3. report	12.4	report	15.4	3. socialize	14.3

Table 8
Discussion Forum—Speech Acts in Phases

	Phase I (%)		Phase II (%)		Phase III (%)	
Blue Team	1. report/ claim/ inquire	23.8	1. claim	44.2	1. claim/inquire	15.4
			2. inform	20.5	2. report	13.5
			3. report	7.8		
Green Team			1. inform	45.7	1. report	25
			2. claim	26.7	2. inform	22.7
			3. notify	12.4	3. inquire	18.2

Table 9
Chat—General Themes in Phases

	Phase I	Phase II (%)		Phase III (%)	
Blue Team		1. social	47.2		
		2. logistics	29.		
		3. content	17.9		
Green Team		1. content	50.4	1. content	41.4
		2. theory building	22.2	2. social	29.6
		3. logistics	12.7	3. logistics	15.9

communication modes in Phase I. They wrap up in Phase III. Phase II is for theory building and content themes, though these two themes persist in the final stage. While this conclusion might be obvious, distance instructors should be conscious of this result and be conscious of which stage his or her students are in

Table 10
E-mail—General Themes in Phases

	Phase I (%)		Phase II (%)		Phase III (%)	
Blue Team	1. logistics	54.2	1. logistics/ content	33.3	1. content	33.3
	2. social	25.4	2. theory building	19	2. logistics	30.8
	3. content	8.5			3. social	28.2
Green Team	1. content	34.3	1. content	61.5	1. content	42.1
	2. logistics	29.5	2. social	38.5	2. logistics	26.4
	3. social	23.8			3. social	21.4

Table 11
Forum Themes Phases

	Phase I (%)		Phase II (%)		Phase II (%)	
Blue Team	1. Theory building	47.6	1. theory building	88	1. logistics	32.7
	2. content	28.6	2. content	9.2	2. content	31.7
	3. logistics	14.3	3. logistics	2.1	3. social	19.2
Green Team			1. theory building	66.7	1. theory building	38.6
			2. content	28.6	2. content	36.4
			3. logistics	2.9	3. logistics	15.9

and provide support and guidance desired at the specific stage.

Conclusion 3: The frequency of speech acts varies over modes of communication. The findings show that the top three frequent speech acts differ across modes (i.e., students do different things in different modes of communication). Students use both chat and e-mail to socialize, while in discussion "socialize" was not an important speech act. Students also use chat when they need an immediate answer to a question, thus "inquire" emerged as a top speech act. Students use e-mail to "report" both personal past events and things they have done for the team. Therefore, the group e-mail is a good source for a conscientious instructor to know what students are doing and have done. "Inform," "claim," and "report" were main activities in the discussion forum. The forum seems to be a place for learners to provide information and state opinions, usually in long paragraphs.

Certain acts that do not surface in the top three also are significant for understanding medium choice. Chat seems to be a place for expressing emotions. This may be due to the fact that immediate feedback can be received, and students may feel more of a personal touch when "listening" and "being listened to" in chat. Going through the chat archive may help the instructor understand feeling of students better than from other modes.

Conclusion 4: There are variations brought by team working style. In the two samples we chose, the Blue team seems a cautious and organized team. They use the discussion forum as the major venue for discussion. They lay out eight topics for the project, and they respond to those topics consistently. The Green Team is a passionate team. They make full use of chat and each time they brainstorm for more than one hour. Their topics and focus can change with the chat going on. Different team styles may be good for different tasks. The instructor should consider team styles and task characteristics and give responding guidance, support and feedback.

Conclusion 5: Media choice and usage is a complex process. Choice of media is com-

plicated by the combination of phases of tasks, communication mode characteristics, and human usage. It is not realistic to conclude on an absolute optimum choice/usage of modes. Multiple variables should be considered.

Contribution of This Research

Distance educators are faced with two challenges: the challenge of designing instructional strategies and student activities, and the challenge of choosing or creating an optimum technical environment. This research starts from the technological perspective (more specifically, the communication media) and relates it to pedagogical issues. Technology and pedagogy are no longer separate considerations for distance researchers. For example, for instructors, asking students to use a certain mode of communication is not only a matter of choosing the most convenient one or choosing the one that the instructor is familiarized with or prefers, it should include considerations of which mode or combination of modes of communication work best for the students and the learning tasks. For system designers, consideration for designing a discussion forum will include additional issues, such as what type of message labels can we build into the forum to facilitate students' discussion and problem solving in addition to the single subject line. This research also examines multiple media at the same time and explores the complexity of media choice.

In addition, results of frequent student speech acts can also be the basis for designing more sophisticated grading rubrics for courses that depend heavily on online discussion. Such rubrics have already been used (MacKinnon, 2000). However, it needs more attention and further refinement based on scientific results.

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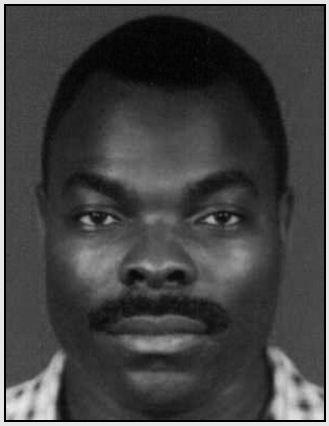
Distance Learning and Bilingual Educational CD-ROM in Rural Areas of the Democratic Republic of Congo

Banza Nsomwe-a-nfunkwa

Nowadays, many countries, especially those that are developed, are concerned by the use of new technologies in teaching and learning in different areas of the daily life of their citizens in different societies. But this is not the case in developing countries, such as the Democratic Republic of Congo, where even the old technologies are still a huge obstacle. In a country such as the Democratic Republic of Congo where, in the case of rural areas, everything is lacking in terms of the information and communication technology (ICT) infrastructure, add to this the lack of electricity and not even a generator nor solar power in some corners of rural areas. Addressing this situation, and our need to participate in, and improve, the well being of the scattered population in the rural areas, is the concept of development of a distance learning system. *What should be the content of this distance learning program? What kind of technology should we use in order to meet the needs of all distance learners? Which language should be used for the teaching and learning?*



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In rural areas of the Democratic Republic of Congo, people are facing different kinds of problems connected to the lack of education and training on a daily level. These are adults characterized by a high level of illiteracy. In the case of the research done in the Kabongo region, the province of Katanga, in the Democratic Republic of Congo, people are facing huge problems related to Cassava diseases and its effect. The effects include a loss in their daily

income and consequently a lack of food and hunger, higher child school-dropout rates because there is not enough money for schooling fees, a lack of clothing, and a lack of money to buy medicine in the case they are sick.

The rural people hope to solve the problem of cassava diseases. The best way to help them is to educate and train them about cassava diseases and the possible ways to fight against those diseases. In this case, the teaching and learning must be done in the local language of the illiterate distant learners.

In this article, the author explains the process of the design and development of the content contained in an educational CD-ROM. In this age of high technology, everyone is trying to focus on new technologies and in some way trying to bypass the old technologies. This is the case of many developed countries, but not in developing countries, such as the Democratic Republic of Congo, where the situation is catastrophic in term of the use of technologies in teaching and learning activities. In rural areas for example, there are still some people who have never seen or used a television, never seen or touched a computer, never used the old and new technologies and, in addition to this, the rural areas lack electricity and all kinds of ICT infrastructure. In these rural areas, there is a high rate of illiteracy and extremely high child school-dropout rates. At the same time, the people in the rural areas of Congo are facing all kind of problems and need to be educated or trained in the way to be able to solve their daily problems. The majority of rural dwellers are farmers living scattered across huge areas in villages. In this case, the use of distance learning is the best way to reach the people. At this point, the question is to know what technology can be used correctly, reliably, and appropriately.

Distance learning via CD-ROM is an opportunity for rural people of the Kabongo region to study wherever, and at whatever time, they choose. All content—audio, evaluation, and photographs—is provided on CD-ROM, and additional prints and tapes will also be provided to help facilitate the successful use of the CD-ROM. To help give students feedback, facilitators will be available for consultation via mail, or face to face.

Distance education uses various media to deliver learning information and to link students and teachers. Some media can be used for both purposes, but they generally fall into two categories: those that can be used to convey subject content, such as print materials, video tapes, audio tapes, television, computer-based courseware, and CD-ROM, and those that permit communication between teachers and students, such as fax, radio, teleconferencing, videoconferencing, and the Internet (The Commonwealth of Learning, 2006). With the CD-ROM, distance learners have a huge opportunity to learn or to train in their own time at their own place (Distance Learning Zone, 2006).

CD-ROM Presentation

The program contained in this CD-ROM is designed to address the basic needs of the rural people in order to solve their daily problems connected to cassava disease and its impact on their daily life, on kids' education, on clothing, etc. This CD-ROM "Le Manioc et ses Maladies" is an educational CD-ROM containing several elements: Images of Cassava, summary, introduction and conclusion; including seven chapters. Chapter 1: History of Cassava, Chapter 2: Importance of Cassava, Chapter 3: Cassava Diseases and Insects, Chapter 4: Importance of Cassava Diseases, Chapter 5: Moment of Decreased Production, Chapter 6: Fight Against Cassava Diseases, Chapter 7: Cassava Dangers and Solutions.

Learning Design

This CD-Rom is adheres to all steps of instructional design. Another advantage with this CD-ROM is that the self-directed learner has flexibility to opt for linear, branched, hypercontent, or learner directed design. The chapters are connected in terms of numbers, but in terms of the content, the learners are free to decide from which chapter to start. But to complete the program, the learner must learn all modules and pass the test for each chapter. For the self-directed learner, the CD-ROM also contains questions for evaluation. But for adult learners who are illiterate, the evaluation will be oral and practical.

In terms of learning design, the specificity of this CD-ROM is that the learners have multiple choices of daily content; they can start from any chapter and head to the evaluation of the chapter (see Figures 1 and 2).

Choice of Language

Here we have to say that this CD-ROM allows the learner to make a language preference following his skills in one language or another. As noted above, our target audience constitutes a huge percentage of illiterates learners; to help them to have a chance to study something on the cassava matter, we decided to design the same content in two languages. This has the advantage of giving each learner the choice of language in which he prefers to learn.

To make a choice between languages is very easy for everyone even for the illiterate learners. It only requires you to move the mouse on the top of the name of the language and click once, and the result is that you have the content in that language (Figures 3, 4, and 5).

Flexibility of Using Voice

An advantage of this educational CD-ROM is that it has voice in both French and Kilubakat language. The voice can be used following the pattern of the learner. It can be stopped in order to make a comment or assess if the learner understood the teacher, or just for a small pause. Also it

Figure 1. Learning design giving multiple choice of study (French version of CD-ROM).

Figure 2. Learning Design giving multiple choice of study (Kilubakat version of CD-ROM).

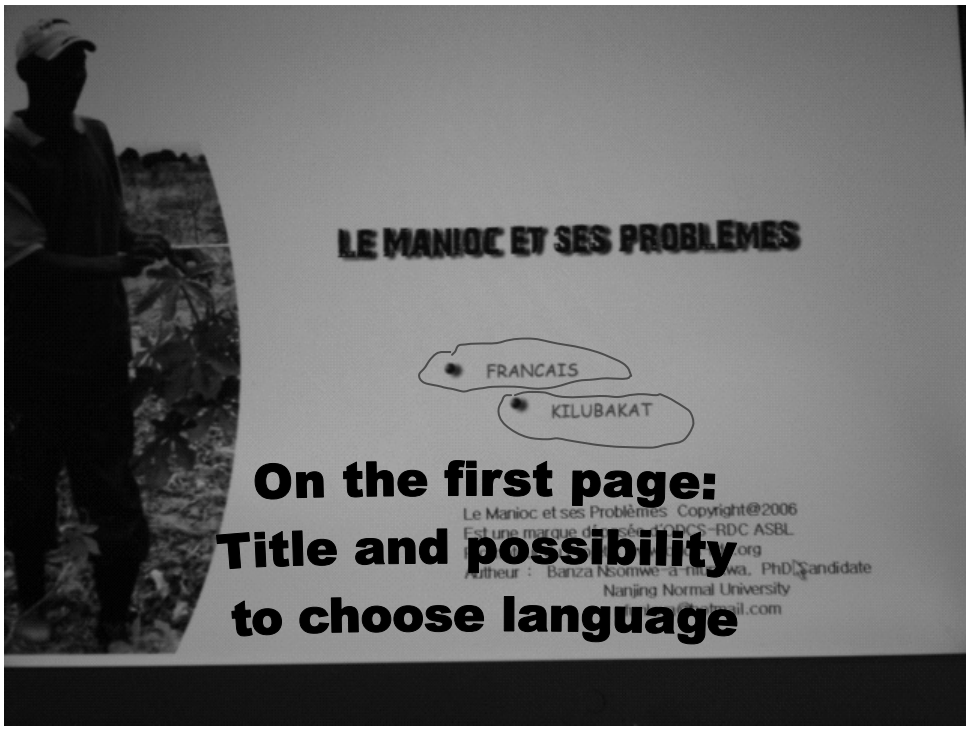

Figure 3. French language.

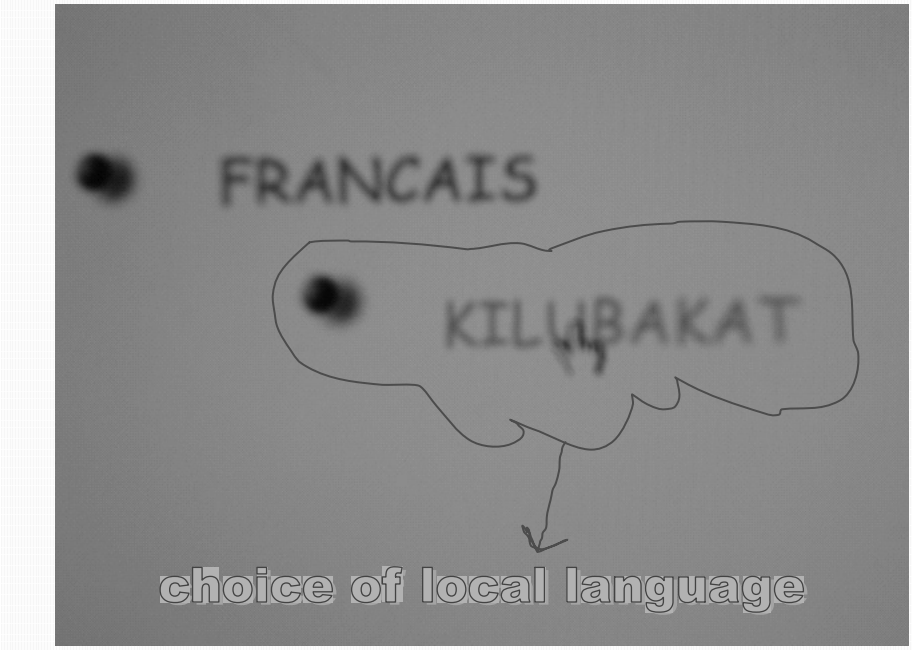

Figure 3. Kilubakat language.

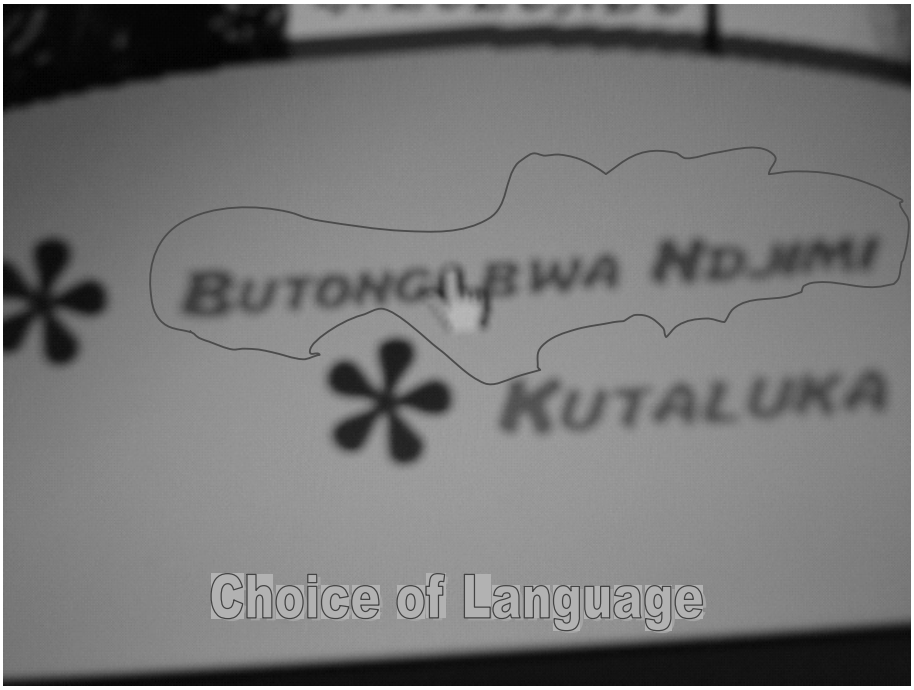

Figure 4. Choice of language.

gives the possibility to preview or to forward through the content.

Difficulties and Obstacles

When designing this CD-ROM, we faced many kinds of difficulties and obstacles connected to time and financial matters. This CD-ROM was designed to meet the needs of the rural people living in the rural areas of Kabongo, in province of Katanga in the Democratic Republic of Congo. The economic situation of this country has a negative impact on all sectors of the people's lives. From the major city (Lubumbashi) to the rural area where I collected data, the distance is approximately 800 kilometers. It took me 3 to 4 days to reach this area because of bad roads and the lack of good transportation.

The survey I conducted with the local people in order to identify their problems was in French, it took me time to translate it into the local language so as to be understood by the local illiterate people (the people who have not had an education and do not speak French).

From their answers to the survey, I discovered that their problems were connected to the agricultural sector, the economic foundation of their well-being. After discussions with them, I discovered that the main issue of focus was cassava diseases and its impact on their life, their children's education, their clothing problem and so on.

Not being an expert in the agricultural sector, I contacted experts and they informed me that there are many kinds of research completed on cassava disease, and the research results were available in the library. After visiting different libraries, I discovered that all research was completed and published in the French language (the official language of the Democratic Republic of Congo), but French is used by few rural illiterate people. The language problem was the first obstacle for the rural people in accessing this information. The second obstacle was the lack of trust in the diseases, the third obstacle was also the resistance to the new agricultural practice, and the lack of appropriate educational strategies for educating rural adult people, and another obstacle was the scattered nature of the population.

From this situation, I developed a program suitable for adult learners living in the rural areas of Kabongo, Katanga Province, in the Democratic Republic of Congo. This program would make efforts to find a resolution to the aforementioned obstacles.

Because of the poor technological infrastructure present in Congo, the choice was made for the use of radio broadcasting to reach the scattered adult learners. The radio will be used in combination with print, audio and video. From this I decided to also design an educational CD-ROM to be used both by teachers, facilitators and self-directed distant learners.

Suggestions

In the case of developing countries such as the Democratic Republic of Congo, the use of educational CD-ROM plays a huge importance in urban and rural areas. Attention should be paid to all obstacles enumerated such as language problem, location of target audience, the nature of the audience, needs of learners, etc.

I do believe that given the lack of new technologies, radio broadcasting, print, CD-ROM, audio, video are all still needed in developing countries, and especially in local regions, where almost all forms of technologies are currently lacking. The realities of the absence of technologies in these areas mean that the use of new technologies is not viable. But in some cases the use of older technologies can meet some of the needs of the population in the terms of education and training.

Conclusion

From this experience from the rural area of Kabongo, Katanga Province, Democratic Republic of Congo, I do believe that the use of radio, CD-ROM, audio, video, print, etc can facilitate distance learning (distance education) for the rural people, and they can benefit from this.

The main goal of distance education should be firstly, and most importantly, focussed on the educational objectives, and not firstly on the technological equipment. This is not to say that new technologies are not welcome in the rural areas of developing countries, such as Congo.

The meaning is that at this level where the economical situation of developing countries, such as Congo, is still delayed, the countries cannot afford all new technologies for rural areas; therefore it is better at present to think of new technologies, but in the meantime use the old technologies.

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In rural areas of the Democratic Republic of Congo, people are facing different kinds of problems connected to the lack of education and training on a daily level.

Effective Science Tools Supporting Best Practice Methodologies in Distance Education

Lynn M. Smith

Best practice pedagogy is becoming more of an important issue as initial implementation technological problems and challenges are solved, and online education becomes a more prevalent method of instruction. Electronic courses have saturated the education markets. The continuum of material contained in these electronic courses varies greatly from well planned, designed, and delivered products to a text-based list of information. As a result, a plethora of best practice recommendations in distance education have been developed by a number of organizations to improve quality of distance courses. The Concord Consortium, a research-based group that investigates online technologies, states the following in their learning model for online teaching: "Asynchronous collaboration, explicit schedules, expert facilitation, inquiry pedagogy, community building, limited enrollment, high quality materials, purposeful virtual spaces and ongoing assessment" (http://www.concord.org/publications/newsletter/2002winter/e-learning_model.html, 2002). A large part of the research conducted within the Concord Consortium focuses on the instructional design to promote inquiry and deeper thinking. The techniques utilized to promote the dual goals of inquiry and deeper thinking are visual models, peer collaboration, multiple revisions, scaffolding and ongoing assessment. Other organizations have developed similar best practice lists that mirror the Concord model (Chickering & Gamson, 1999; Palloff & Pratt, 2003).

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The design of high quality elements that promote higher level thinking in science are where this article will focus. There are, therefore, many questions that face schools when deciding on appropriate and power-

ful methods to design distance education courses. Is distance education being taught in a manner that allows for students to learn and understand material, or is it presented in a largely text-based format? Does the present format of lesson presentation increase student achievement or are there better methods? Does the presentation of material affect student achievement or dropout rates? Can students understand complex materials via a text-only format? Are there methods for addressing and reducing the incidence of online cheating and plagiarism? So, what do schools look for when deciding to improve or initiate online instruction? The answer focuses in four areas of concern: higher level thinking, assessment, plagiarism or cheating, and a best practice measure that, if implemented, will make a huge positive difference.

Deeper thinking and promotion of student inquiry have been an educational concern for many years. In online courses, it becomes a larger concern since many instructors, struggling with the technology, and simply input large volumes of textual material into their online courses. Further, the level of thinking required from students is often limited. Most online courses according to Jonassen (2002) support "knowledge acquisition and reproductive learning." He expounds on the problem: "First, acquiring knowledge does not lead to or facilitate complex skill or problem solving development. Second and more insidiously, knowledge acquisition assumes an absolutist epistemology in which content is believed to be the truth." Peirce (2003) reiterates this view when he cautions against seeing students as containers to fill with knowledge. Additionally, he promotes the use of higher order thinking skills in online environments. Meyer (2002) concurs and goes on to cite the profusion of text-based instruction in distance environments that do not promote higher level thinking or problem-solving.

Watts (2003) calls for the application of quality face-to-face good practice measures in distance education courses. She promotes the expanded use of critical thinking skills and renewed appreciation for diversity and relationships, a backbone standard in science. Watts believes that technology can be the vehicle to bring people and cultures an increased sensitivity toward others. These are all goals of science education in the new millennium. Jonassen (2002) and Conrad and Donaldson (2004) also forward methods to increase higher level thinking skills and critical thinking. They subscribe to the notion that distance education courses should not mirror the lecture-then-test format so common in face-to-face instruction, but it should be an opportunity to innovate and employ engaging and proven methods. Jonassen also champions the crafting of complex deeper thinking activities as a method for promoting systemic change in online teaching environments.

High-quality assessments go hand in hand with deeper thinking. The attributes of quality assessments, according to Mason (2002) are: they are authentic and holistic, the vehicles for improvement, are reliable, valid and cater to a variety of learning styles and needs. There are a variety of assessment possibilities that require the production of a unique product that cater to differing learning styles and that are tools for understanding.

There is a fundamental shift in interaction, learning paradigms, and assessment techniques that must result from the change as one moves from face-to-face to distance teaching. Online assessment must be authentic, ongoing, multidimensional and reflective to be effective in a distant environment. The added benefit is that online assessments allow the instructor to give weight to each student response to assess his or her own individual understanding (Robles & Braathan, 2002). The move away from multiple-choice knowledge level assessment techniques in dis-

tance education is mirrored by Pierce (2003), Mason (2002) and Conrad and Donaldson (2004).

Plagiarism or outright cheating has arisen as a grave concern for online educators due to the unlimited student access to material. Therefore, the use of a technique that reduces the likelihood of copying someone else's work is recommended (Meyer 2002). One method, the use of visual representations, produces a unique product that can not be copied from others, facilitating original work and thoughts. This forced processing of the material adds to student understanding and reduces the impact of rampant plagiarism (Mason 2002). Other methods include process-based products that while the assignment is the same, the output is different for all students. It requires the instructor to generate a singular assessment that will demonstrate what the student knows and is able to do.

Courses offered at a distance are still education and therefore, while input and output modes are different, they require a set of design strategies that accommodate good educational practice. What is known about this area of study is that good practice methods that work in a classroom also appear to work in distance education. According to Brabee, Fisher, and Pitler. (2004) today's technology supports Marzanos' (Marzano, Pickering, & Pollock, 2001) nine strategies for increasing student achievement. Some of the supportive technologies are word processing technologies that accommodate making graphic organizers, the building of analogies and allowing for collaborative editing and dialoguing, and Inspiration software that is also a facilitative tool for the development of complex mapping and visual organizers. Digital media creation tools (iMovie, PowerPoint, HyperStudio) are also direct supporters of the creation of best practice distance education products for the promotion of conceptual science understanding.

Egan and Gibb (1997) also promote constructivist theory for designing online instruction. They studied the components of optimal student-centered learning tools and their application in telecourses. To maximize student outcomes, active, multimodal, visual activities must be employed in telecourses development. This trend promoting constructivism continues in a study by Berge (2002). He studied a variety of e-learning strategies to determine their effectiveness as tools of distance education, and he persists with emphasis that communication is a tool for development of self-reflection and inquiry skills. Hacker and Niederhauser (2000) also encourage active participation and collaborative problem solving along with effusive feedback and use of real-world examples in distance education.

Good practice distance techniques are also reiterated by the principles put forth by a number of authors in the field (Clark & Mayer, 2003; Conrad & Donaldson, 2004; Henry, 2002; Madrazo & Vidal, 2002; Meyer, 2002; Rosenberg, 2001; Schank, 2002; Simonson, Smaldino, Albright, & Zvacek, 2000). Schank (2002) states that "Memorization has no impact on behavior; it does not translate into learned skills" (p. 62). This notion of learning is rooted in the assumption that memorization meant learning had occurred. This assertion has little evidentiary support in fact or practice. Learning has occurred if the individual processes the information, anchors it in experience, and transcribes the information to the long term memory.

Cyrs calls for increasing visual thinking skills because the new technologies lurking in our future will allow for more access to information for students. This freer access and improved technological tools should not be an invitation to continue less-than-exemplary educational practices, but should free instructors to deliver similar content with better methods and spectacular results (Cyrs, 1997a, 1997b). Cyrs also calls for the essential and expanded use of

visual tools to sift, organize, and relate the multitudes of information now available to students, and he encourages online educators to expand their teaching skills to the capacity of the technologies available using the best distance education methods available.

Virtual or authentic manipulatives are also essential elements for exemplary distance education science programs. These manipulatives support National Science Teachers Association goals to provide students with a distant education experience that emulates a laboratory experience in a fully equipped face-to-face lab. Strategic planning and implementation of materials provides not only a kinesthetic anchor, but also an experience that increases and deepens student understanding. In the final analysis, a high-quality distance education science course is as important as quality face-to-face programs. Given the rapid roll-out of distance education courses to fill the ever-increasing demand, it is adherence to these best practice measures that will assure a lasting and valid science experience.

You will design an underwater exploration tool (ex. submersible, diving technology or observational tool). This tool needs to be original work, designed by you. You will need to think about all of the following as you design this tool.	
Criteria	
• Description of tool (Describe all parts of the tool/vehicle you developed)	
• Purpose of tool and it's parts (Explain the HOW and WHY of the tool/vehicle you developed)	
• Blueprint of tool (Draw or build and label the parts of the vehicle)	
• Describe the history of the development of your tool/vehicle	
• Describe the design challenges for your tool/vehicle and how you solved them	
• Overall organization, quality and depth of assignment	

Figure 1. This activity is an example of an activity that requires the production of a unique student output but also one that demonstrates student understanding of design, development, and exploration. The background knowledge is based on a Web Quest that guides students through NOAA's exploration WebPages.

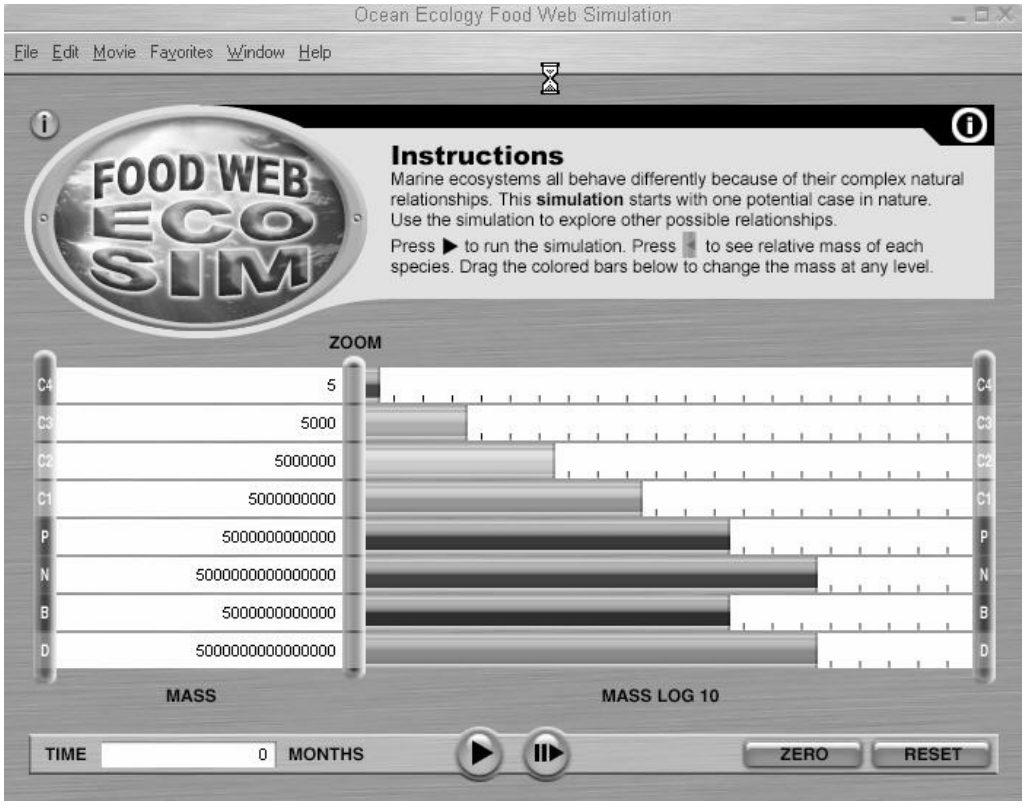

Figure 2. This simulation provides students with the opportunity for an in-depth look and manipulation of the factors that contribute to the complexities of food relationships within an ecosystem. Accompanied by a set of guiding questions, the learning potential is limitless.

Figure 3. This internal and external fish dissection simulation allows students to experience fully interactive fish dissection with experiencing the complications of dissecting at a distance. The activity can be extended to include a local dissection is there are appropriate facilities and supervision.

Design a Children's Book Assessment

You have been assigned a randomly chosen organism. You need to design a *Children's book* for your assigned organism. The children's book will have to be written for children in K to 2nd grade. Use appropriate language and visuals for this age group. Submitting a text document only will result in a returned assignment. Use graphics and pictures appropriate to children. Use the grading rubric below to guide you in the development of your children's book. The children's book will have to include ALL of the following: Fit to the environment, food relationships explained, behavior, related organisms, systems and evolutionary history. The grading rubric is below:

Criteria	Exemplary 3	Acceptable 2
Fit to environment	The organism is very well adapted to their described environment	The organism is adapted to their described environment
Food relationships	The relationship of the organism to the food sources in the ocean is completely developed (food web)	The relationship of the organism to the food sources in the ocean is developed (food chain)
Behavior	Behavior of organism is closely related to environment	Behavior of organism is related to environment
Related organisms	Symbiotic and commensal relationships are developed	Symbiotic or commensal relationships are developed
Systems	The systems of the organism are related to and adaptive of the environment	The systems of the organism are related to the environment
Evolutionary History	The past history and evolution of the organism is clearly developed	Changes the organism has experienced through time are mentioned
Children's Book Design	The design is conducive to a children's book in language and visuals	The design lacks appealing elements of a children's book

Figure 4. This assessment activity requires students to utilize knowledge gained, process it, synthesize and adapt it and finally produce a product that demonstrates their understanding in a manner that is not regurgitative.

Classify This Mystery Ocean Assessment

This is where you put your knowledge to the test! You need to Use your prior knowledge to classify the ocean below. The characteristics are listed for you to study in order to make your determination. This ocean is NOT clearly going to fit into an ocean that you have already studied. It should be a combination of oceans, but you will have to decide which is most likely and why. This ocean will share characteristics of several oceans, so it is your supporting statements and evidence that you will be graded on. The best way to approach this assignment is in the following manner:

1. List characteristics that make this ocean similar to other oceans (ex. It is clear, deep and blue like the Atlantic). Make sure to include living organisms, physical characteristics, weather and currents, and topography.
2. Make a hypothesis about where this ocean is and state WHY you think that. Use the evidence you obtained from studying the oceans and from reading this passage.

The Mystery Ocean:

General Information:
The deep blue waters of sea have an abundance of plant and animal life. About 2 million square-mile ellipse—lie many hundreds of miles from any shore.

(continued on next page)

Defined by a floating lens of warm, exceptionally clear water, its location determined by the changing ocean currents that, flowing in a clockwise promenade, form its perimeter, this ocean is known for clarity. The life that riddles its surface is actually a deceptively lush veneer to a stretch of ocean that is relatively devoid of life at deeper levels. But even in this ocean "desert," there is an intricate web of life that has adapted to existence.

Physical Properties:
This ocean is 5.2 million square miles with a clockwise-circulatory current. Currents in the area are generally weak, with mean velocities of <5 cm s-1 at 500 m depth and decreasing to <1 cm s-1 below 1500 m depth. However, one area of this ocean has the most energetic currents of the world ocean. The bathymetry of the area averages about 4500 m water depth. The special properties of this ocean inhibit the cold water nutrient upwelling resulting in little food and clear, pure, but biologically poorest ocean water. The salinity of this ocean is 36 ppt (parts per thousand). World ocean salinity varies from near zero to 40 ppt, while the average salinity of the world ocean is 35 ppt. Also due to the special properties of this ocean, it is 1 meter higher than the surrounding oceans.

Organisms of the Ocean:
One third of the world oceans plankton is produced here. Each night, a migration takes place in the waters that rivals any in the animal kingdom. Perhaps unknown to Beebe, however, was that some of the deep-sea creatures he found often leave the deep. Each evening as the sun sets over this ocean, millions of these sea creatures migrate up from the depths to feast on microscopic plants growing in sunlit surface waters. At dawn, these animals reverse course, sinking or swimming down to spend another day in the darkness. By almost any measure, this daily migration rivals the great seasonal movements of caribou on land or arctic terns in the air. Yet its magnitude was virtually unknown to science until the 1940s, and many of its mysteries remain. Many of the animals are invisible to the naked eye. A glance under the microscope, however, reveals a startling and beautiful world filled with animals stranger than any imagined in science fiction! "For animals of this size swimming upward as far as 1,500 feet each evening, then returning in the morning, takes a lot of energy and requires traveling tens of thousands of body lengths every day. It would be like a person walking 25 miles each way to get to and from breakfast." Some of the largest migrators include euphausiids, or "krill," shrimp-like animals that reach a few centimeters in length and are best known for their importance as food for whales. Other important migrators include the smaller copepods. These "insects of the sea" are the most common and abundant animals on earth.

Figure 5. This assessment requires students to process knowledge level questions and then hypothesize using evidence on the probable location of this ocean. Note that this passage has characteristics of several oceans and so there is no absolute correct answer and all student outputs are unique.

Value Line Guide:

1. **Look over these terms and define them fully (use references if necessary):**
   - **Diversity**
   - **Natural Selection**
   - **Evolution**
   - **Adaptation**

2. **Decide on the terms you will place at the ends of the value line.**

3. **Determine your criteria for placement.**

4. **Place the above terms on the value line using your criteria.**

Figure 6. The assessment above enables students to apply knowledge and extend their understanding well beyond content knowledge acquisition.

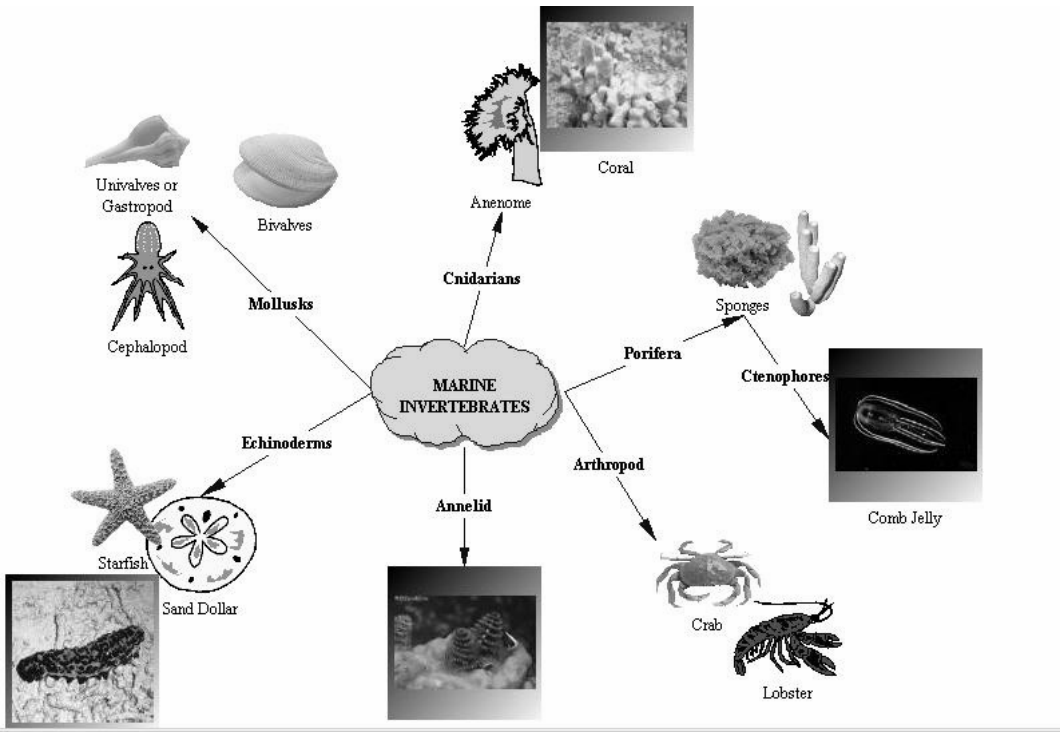

Figure 7. *Inspiration* © is a useful tool for delivering content as well as use by students to generate a unique assessment output. These student products can be graded using a rubric designed for assessing understanding in a visual manner.

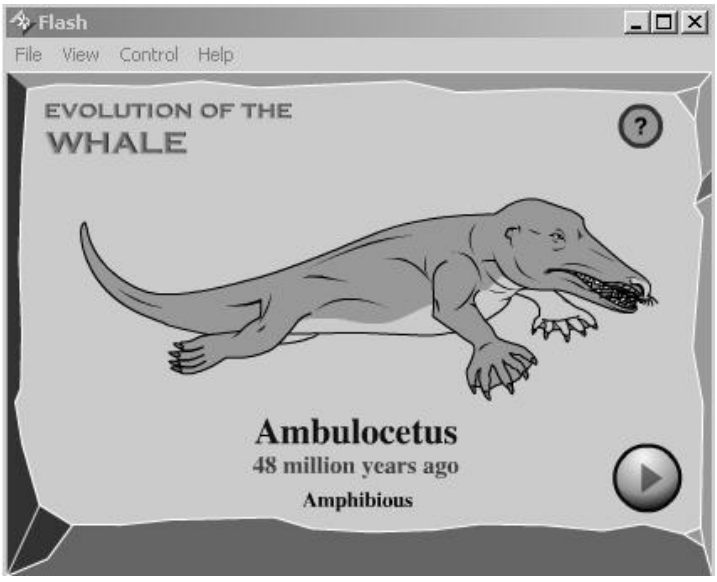

Figure 8. This whale morph simulation allows for flexible student use of tools to open guided discussions on evolution and adaptation of marine mammals.

Figure 9. Videos with supportive guides, in this case an identification guide, allow for students to experience an authentic environment while supporting the content goal of identification skills.

ROLES:

1. A **CONSUMER** who frequents Red Lobster Restaurants and demands fresh lobster at least weekly.
2. A **LOBSTERMAN** who makes 100% of his living from lobster fishing.
3. A **POLITICIAN** at the **STATE LEVEL** in Maine.
4. An **ENVIRONMENTALIST** interested in preserving the species and the oceans.
5. An **AQUACULTURIST** who cultures lobsters for commercial sale.

WEBSITES:

- **ALL** Participants view this website first:
http://octopus.gma.org/index.html (click on All About Lobsters)

- **Consumer Websites:**
http://octopus.gma.org/index.html (click on All About Lobsters, then Eating Lobsters)

- **Lobsterman Websites:**
http://www.crewdog.net/lobsterpage/
http://www.state.me.us/dmr/rm/whale/summary_gear_modification.htm
http://www.nmfs.noaa.gov/ (click on Commercial Fisheries)

- **Politician at state level Website:**
http://www.state.me.us/dmr/rm/whale/summary_gear_modification.htm
http://www.st.nmfs.gov/st1/econ/cia/laws_links.html
http://www.state.me.us/dmr/ (click on Maine Laws and Regulations)

- **Environmentalist Website:**
http://www.lobsters.org/resrch/research.html

Figure10. A cooperative online Jigsaw discussion enhances higher level thinking and allows students to experience empathy as they discuss and develop roles based on authentic data and information.

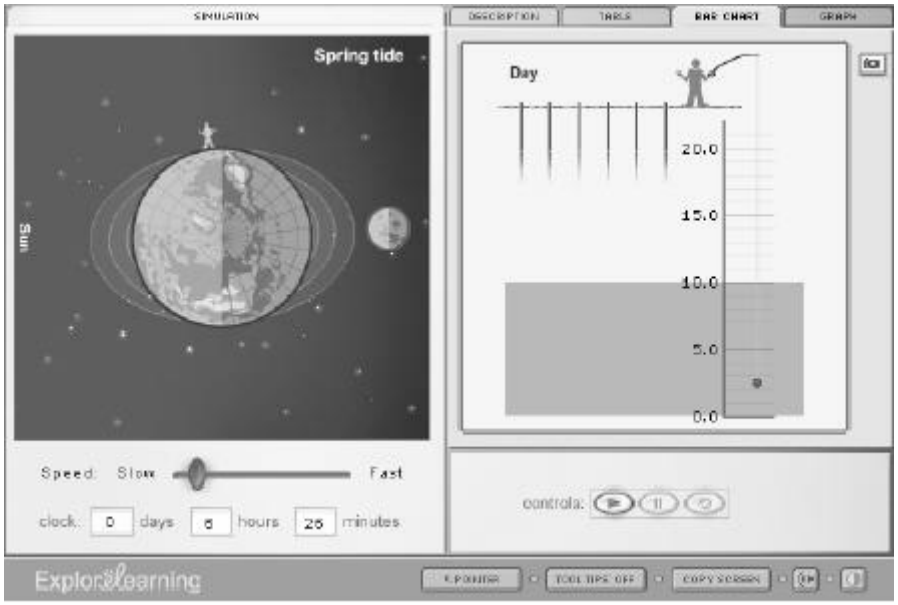

Figure 11. Virtual manipulatives like this Gizmo © are excellent choices for increasing student understanding (ProQuest Information and Learning, 2004).

Figure 12. Hands on, authentic science materials improve student achievement in distance education. The manipulation of materials with content computer support allow for student understanding.

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COURSES OFFERED AT A DISTANCE ARE STILL EDUCATION AND THEREFORE, WHILE INPUT AND OUTPUT MODES ARE DIFFERENT, THEY REQUIRE A SET OF DESIGN STRATEGIES THAT ACCOMMODATE GOOD EDUCATIONAL PRACTICE.

The Scoop on Interactivity

Carmen Taran

A few years ago, BMW released the 745i model—firm and sporty, smooth, and exceptionally quiet. Yet it was deemed driver-unfriendly. Why? Because the onboard gadgets and gizmos were suggestive of a space shuttle cockpit. For instance, it took six steps just to change to a new radio station! The car also came with a manual that owners had to give to parking attendants, because the only thing intuitive about the car was how to open the doors.

Certainly, BMW meant well. And so do we, designers, when we incorporate extraneous interactivity in corporate online instruction. Lately, I have heard so much self-conscious and plaintive talk from training managers, clients, students, and other corporate luminaries. The theme is reoccurring: we deliver beautiful and achingly brilliant interactions, yet they are often woefully inadequate for the task.

Carmen Taran, R&D Specialist, AT&T Training.

At what point does interactivity become unnecessary in corporate online training? First, in very generic terms, let me describe interactivity types, as seen in online instruction:

- Click-me activities and rollover effects to view additional information.
- Practice exercises, such as multiple choice, true/false, drag-and-drop, fill-in-the-blank, and so forth.
- Simulations (mainly of software or Web-based applications) in which students are asked to follow a set of instructions to learn how to use an application.
- Games, such as word search, hangman, concentration, or Jeopardy.
- Virtual labs, which allow users to interact with an online representation of a piece of equipment (e.g., learn how to build an electric circuit).

The complaints I hear revolve around the fact that designers have the tendency to include interactions in online reference materials or online job aids (versus including them in traditional Web-based training). One of the differences between online job aids (or electronic performance support systems) and pure online training is that the latter provides content that needs to be remembered and therefore rehearsed properly. In such a case, a large amount of interactivity is appropriate.

Why do designers include unnecessary interactivity in online job aids? Some do it just because they think students may get

bored viewing a Web site; or, because some interactions (exercises, click me events, some simulations and games) are seductively easy to develop; or, because they are simply told to do so.

Interactivity in online instruction has been addressed in the literature, but little information exists on how and when *not* to use interactivity and what the consequences are when interactivity is used inappropriately. The goal of this article is to provoke some thinking about the missing research data.

As a designer, I report from the trenches, and here is the scoop: interactivity is indisputably a catalyst for learning, but it is needed mainly in those situations when training content needs to be memorized. When you're developing online reference materials or online job aids, interactivity is not going to help. For instance, in Figure 1, the rollover effect (which took some time to develop) is an unnecessary step. There is no reason you should "hide" information users may need—such as how to set a password—behind a rollover effect. Superfluous and unnecessary, such interactions often transform the review of online materials into a time-devouring task and do not maintain users' motivation.

The instance when rollover or click-me interactions would be appropriate in online job aids is when you have very little screen real estate. However, with modern users' ability to use increased screen resolution, that is rarely the case. For producing effective online job aids, an intuitive interface and navigation system, accompanied by a reliable search engine in case of complex content, is all you need to satisfy and help students.

Do you ever experience an almost irrational exuberance because you can easily program interactive components and hence want to include a few in all your instructional products? I know I am guilty. We often impress our clients and managers with our technical skills at the risk of making our students cranky because unnecessary interactions clutter and slow down access to pertinent information. If professional recognition is what you need, do not base it on the amount of programming you do, but rather on quality comments received from satisfied students.

When you do fall victim to computational fashions that demand that you include interactivity in anything you design, at least be sure to produce a *meaningful* interaction. Take a look at Figures 2 and 3. Clicking on objects to reveal informa-

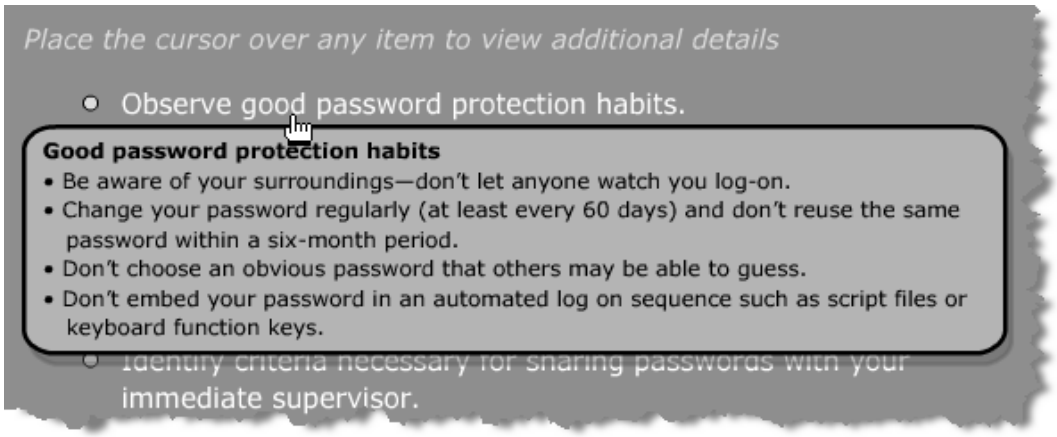


Figure 1. Click-me interactions are often unnecessary in online job aids.

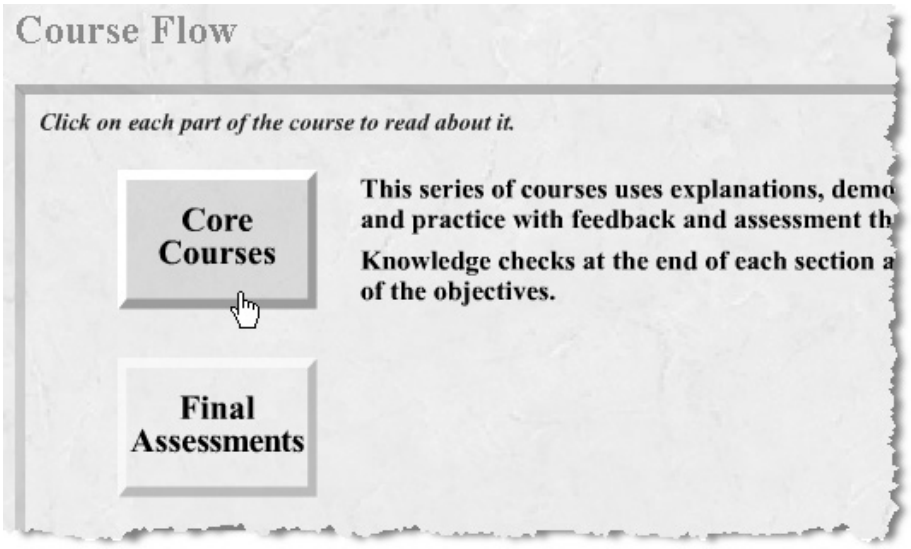


Figure 2. Example of a click-me interaction with no instructional value.

Figure 3. Example of a click-me interaction that is instructionally meaningful.

tion has no instructional value. Clicking on objects to solve a conceptual problem does.

Unfortunately, I hear that there are times when designers are simply told what to do and how to do it. In those cases, I say don't be shy. Reveal the bold reality to your clients: not everything needs interactivity. An effective statement to practice in such situations—with diplomacy—is "Don't tell me you need a bridge. Show me the canyon."

The best judges of the amount and type of interactivity needed should be your users anyway. Verify with them often so you can generate the kind of online materials that are hardwired to users' work place and preferences.

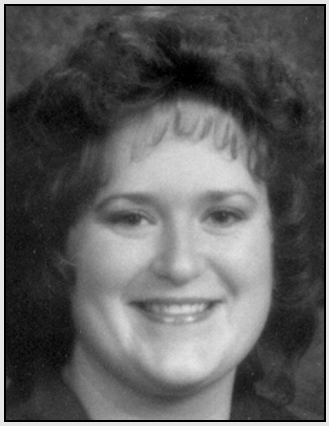
Sometimes, if the desire to get a little nerdy is too strong, do include some interactive elements in online reference materials, but in moderation. The 745i model released by BMW certainly had some features—such as eliminating the ignition key—that may soon become common in the automotive industry. However, it had too many unnecessary features all at once. Be moderate. A little nonsense interaction is relished even by the wisest of the students.

Streaming Video and Distance Education

Teresa Grey Mullins-Dove

Introduction

Although the use of film and video has a long history in education, the widespread adoption and use of these technologies have always been hindered by production costs and delivery problems, particularly in the case of distance education. However, the creation and refinement of digital, Web-based video, also called streaming video or Webcast, enables educators to use video technologies in online courses or distance education without being limited by these conventional constraints. One of the most common complaints about distance education from students is the lack of human contact between students and instructors. One method of incorporating the human element into a distance education course is through the use of streaming video (Nickerson, 2003).



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Streaming video is a new instructional technology used to deliver audio and video presentations over the Internet, allowing the content to play, or "stream," as it is being downloaded from the source (Lenoir Community College, 2002). The viewer does not have to download a file to play back once the download completes. Instead, the file is simultaneously downloaded and viewed, leaving behind no physical file on a viewer's machine (Reed, 2001). Recent studies indicate that streaming video shows promise in distance education in enhancing student attention, creating more effective instruction, and facilitating learning (Cohen, 1997; Ertmer, Addison, & Lane, 1999; Giddings, 2000; Sanders & Morrison-Shetlar, 2001). With such positive results as these studies, distance educators and instructional technology leaders should explore the possibilities of this technology in depth and evaluate whether they can utilize its features in their own teaching or distance education programs.

Types of Streaming Video

There are two major categories of streaming video: live and archived (Lamb & Johnson, 2002). Live Webcasts include real-time events that are viewed as they are

occurring, allowing some viewers even to interact with the event. Often, live events that allow viewer interactions are referred to as video conferencing. Examples of live Webcasts include live, online lectures given in a program such as Elluminate, National Geographic Live Events, traffic cams, videos of outer space, NASA TV, Newsline, and Exploratorium Webcasts. Archived Webcasts are simply Webcasts that are prerecorded and can be played back at a later time. Many real-time or live events are often recorded so that viewers can play them at their convenience. For instance, if an instructor uses Elluminate and records the session, viewers can then replay the session at a later time if they were unable to attend the class or if they just want to rewatch the meeting.

Providers of Streaming Video

There are thousands of Web sites and companies that offer video streaming in one or more formats. Often, companies and services will offer both live and archived productions that can be viewed within a Web browser or played in a stand-alone viewer such as QuickTime or Windows Media Player. Emerging leaders in the area of video streaming include HorizonLive, LearningWeek Live (LWL), CREN, and the TLT Group (Bell, 2003). However, there are also video streaming services available to educators for free or for a minimal charge. Some of the more common providers are discussed below.

UnitedStreaming is an archived video streaming service created by Discovery Education that contains over 4,000 full-length videos and 40,000 video clips for K-12 education (Discovery Education, 2006). It is the largest and most up-to-date digital video library available today. Not only does the service provide videos for curriculum areas such as mathematics or science, but the service also supplies professional development videos for educators. Educators can search through the vast database of videos by curriculum standard, keyword, grade level, or content area. Additionally, this service provides blackline masters, teacher guides, and standards correlations to use with some of its videos. Empirical studies done on this service in both Los Angeles and Virginia indicate that it is the only standards-based video-on-demand company that has been shown to increase student achievement (Discovery Education, 2006).

EdVideo Online is a free, archived streaming video resource for New York K-12 and adult educators. This service contains over 2,600 full length videos and 26,000 video clips, ranging from mathematics to the visual arts. Similar to United-Streaming, this database can also be searched by curriculum standard, keyword, grade level, or content area and also contains worksheets, blackline masters, and teacher guides that go along with the videos (WPBS-TV, 2006).

Public Broadcasting Service (PBS) is one of the most widely known services for providing video tapes and local programming, but it is also becoming one of the leaders in streaming video as well. PBS is headquartered in Alexandria, Virginia and is a public, nonprofit corporation that is owned and operated by 348 public television stations across the United States. PBS reaches nearly 90 million viewers each week by television and to an increasing number of digital multimedia households. Videos in such categories as nature, history, arts and drama, life and culture, and news can all be watched on the PBS Web site. Companion Web sites also accompany all online videos, and contain additional information such as characters, timelines, maps, and teachers guides (PBS, 2006).

Creation of Streaming Video

Educators do not have to subscribe to a streaming video service or log onto the Internet to access this powerful resource; they can make their own streaming videos to use within their courses or provide to students. First, deciding whether to create

a live or archived video needs to be considered. If editing is a feature that an educator wants to use, creating an archived video is probably the best choice. Production software such as Elluminate, Microsoft Producer, Adobe Production Studio, iMovie, Macromedia Flash, QuickTime Authoring Studio, and Final Draft can take footage from an analog or digital camcorder and create streaming files that can be put into online courses or on the Internet. Stilborne and MacGibbon (2001) offer the following guidelines to educators who choose to create and use archived video streaming in their distance education courses:

1. Events should be under 90 minutes and structured around a few basic themes;
2. Use good quality equipment and check wiring connections to ensure good audio quality;
3. Use an external microphone to eliminate unwanted background noise;
4. Use a simple backdrop;
5. Close-up shots with minimal movement work better than distance shots;
6. Avoid a lot of camera movement or zooming;
7. Use simple, graphic visuals to accompany a video presentation.

Educators could also choose to do a live Webcast for their students, using software such as Elluminate to facilitate the discussion. However, it is suggested that if an educator chooses to do a live video stream with a class, the instructor should take care to record the event so that those who are unable to attend or want to rewatch the broadcast have the opportunity (Nickerson, 2003).

Uses of Streaming Video in Distance Education

The most common use of video streaming in distance education is prerecorded or live lectures given by the instructor. Web-based prerecorded lectures are often referred to as asynchronous lectures, lectures on demand, just-in-time lectures, or simply Web-lectures (Brusilovsky, 2000). Many faculty members consider Web-lectures invaluable to the online or distance learning environment since neither the textbook nor handouts can adequately compensate for current lectures done by a leading researcher in the field. In fact, LaRose and Gregg (1997) found in their research that Web-lectures are at least as efficient and effective as regular, classroom-based lectures.

Brusilovsky (2000) also indicates that students appreciate the use of Web-lectures in distance education because it gives a "feeling of the classroom." Young and Asensio (2002) also found that the following are additional benefits experienced by students in distance education classes that use video streaming: student has control; student can rewind and replay content as needed; greater audience numbers can be reached; greater access to learning for physically disabled students; and provides more interaction with course content.

Although creating or giving online lectures is a common practice in distance education, it is not the only use for streaming video in the field. Using guest lecturers, administering professional development programs, and recruiting students are also ways that streaming video can be used in distance education programs. Guest lecturers in traditional classrooms often give students the best possible learning experience by providing real-world experiences related to instructional content; however, it is often difficult to find dynamic guest lecturers who are available to come into a classroom and give a presentation to students. Streaming video is now making the challenge of finding an exceptional guest speaker easier. Guests can access online software to create a Webcast or even participate in a live event without having to travel or change schedules. Students can then interact with the guest lecturer and

experience the benefits of asking questions to an expert in the field. Many educational institutions are creating archives of guest lectures to use in both distance and traditional courses and, as this newer technology continues to expand, the pools of archived Webcasts will continue to grow (Bell, 2003).

Providing up-to-date, quality professional development is a growing need both in education and in industry. Brown (2004) indicates that using digital video in professional development programs makes "real-time transmission of information and ideas more effective" (p. 54) than print materials. Many streaming video services such as UnitedStreaming, EdVideo Online, Learner.org, and PBS offer a professional development series for educators that cover a variety of topics such as pedagogy, content knowledge, classroom management, e-learning, and technology.

Finally, one of the newest uses of streaming video is the recruitment of students for various programs. West Virginia University's graduate nursing program developed a Webcast for potential students to see what taking a class in their program generally entails (http://webclasses.hsc.wvu.edu/wvusonrecruit/index.asp?RPOne=true). Feedback from potential students has been very positive regarding this aid to deciding whether a program is right for them (DiMaria-Ghalili, Ostrow, & Rodney, 2005). Nova Southeastern University also uses streaming video to promote its online programs to prospective students. The Instructional Technology and Distance Education program in the Fischler School of Education uses an archived video stream on its Website to give potential students an introduction to its program (http://www.schoolofed.nova.edu/itde/).

Effects of Streaming Video on Student Achievement

Several empirical studies indicate that the use of video streaming in both traditional and distance education programs increases student achievement. Two independent evaluations by Cometrika have been completed on the UnitedStreaming service, and both studies indicate significant gains in student achievement as a result of using this streaming video service. The first evaluation took place in three school districts in rural Virginia in 2002, and significant gains were noted in third and eighth grade science and social studies scores. The study used a random assignment design and involved a pretest, followed by a month of exposure to over 30 UnitedStreaming video clips pertinent to state standards, and then a posttest that measured the state standards that were covered in the video clips and instruction. A summary of the results showed that the experimental group's improvement exceeded the control group's improvement by over 12.6% points. The second evaluation was conducted in the Los Angeles Unified School District during 2004, and results indicated a significant improvement in student test scores in sixth and eighth grade mathematics. Approximately 2,500 middle school students in the district participated in the study. Each student was given a pretest to measure mastery of specific California state standards, and then a posttest at the end of the academic quarter to measure improvement. During the quarter, teachers in the experimental group used approximately 20 UnitedStreaming clips related to the state standards, while those in the control group received traditional instruction. The results of the study indicated that the experimental group outscored the control group by 3-5%, which was statistically significant (Discovery Education, 2006).

Boster, Meyer, Roberto, Inge, and Strom (2006) conducted a pretest-posttest, control group study to measure the effectiveness of video streaming on student achievement. A total of 913 students and 38 teachers in rural, southeastern United States participated in the study. Results of the research indicated that the experimental

group improved almost 13% more than students in the control group. However, despite the effectiveness of streaming video in this particular study, uncontrolled factors related to content and delivery systems may have had an effect on the results of the study. The authors of this research indicate that further research is needed to determine if the results of this study are consistent with other groups of students.

Michelich (2002) indicates that in her study, student feedback has been very positive regarding their experimental biology classes that incorporated streaming video as a component. Online students indicated that the video clips helped them understand difficult concepts, increased their motivation and participation in course discussions, and improved their performance on course assessments. However, Michelich has not done any formal surveying or analysis of the data thus far.

Recent studies indicate that whether or not the use of streaming video actually increases student achievement, perceptions of this technology are positive, both by instructors and students. Educators who choose to use this technology in their courses provide yet another way to reach students in a heterogeneous classroom. Gardner's multiple intelligences theory indicates that students vary in their learning and perceptions in the classroom. By using technologies such as streaming video, online and distance education courses will reach more students than ever before (Gardner, 1993).

Advantages and Disadvantages of Video Streaming

Using streaming video in a distance education course has advantages and disadvantages (see Table 1 and the discussion that follows).

Videotapes and DVDs can be expensive and quickly become outdated. Editing and copying these videos can also be very time consuming and costly (Boster, Meyer, Roberto, Inge, & Strom, 2006; Brown, 2004; DiMaria-Ghalili, Ostrow, & Rodney, 2005). Streaming video offers educational institutions a chance to quickly download, copy, and view videos at minimal cost. Subscription costs to streaming video services are often minimal and in some instances free. Recent studies also indicate that although streaming video may or may not increase student achievement, students in courses, especially distance education courses, prefer the use of videos (DiMaria-Ghalili, Ostrow, & Rodney, 2005). Students are able to view the Webcasts multiple times, pause the video to take notes, and access the materials at their convenience.

There are some definite disadvantages to using this new technology as well. Only a modest amount of videos have digital rights, and gaining permission to use videos in an online setting can also be difficult (Boster et al., 2006). Bandwidth and Inter-

Table 1
Advantages and Disadvantages of Using Streaming Video

Advantages	Disadvantages
Minimal cost	Digital rights
Rewind, pause, review for students	Technology breakdowns
Access for students	Bandwidth
Current, up-to-date	Slow Internet connections
Reach wider variety of students	Creation time
Minimal technology needed to view	Lecture-style
Maintaining attention	
Ease in editing and copying	

net connectivity are also issues that will greatly affect viewers when trying to access streaming videos. Although users with a dial-up modem are able to view videos online (if they are compressed well enough), the quality of the videos can be very poor (Klass, 2003). Additionally, creating Webcasts from scratch also poses many challenges for educators. Considerable upfront planning and time is needed to create quality, up-to-date productions. Videos that are put together without a definite plan often look amateurish or become boring with the "talking head" syndrome (Brusilovsky, 2000).

Future Possibilities

So, what does the future hold in the area of streaming video in distance education? The emergence of more mobile computing products will have a definite impact on streaming media. Students will be able to access videos from cell phone, iPods, or even PDAs (Klass, 2003). Extensive archives of streaming video productions will be created for educators to search and use in their courses, and students will gain access to expert guest lecturers from around the globe (Bell, 2003). Physical attendance at conferences, in-class lectures, professional development programs, and corporate meetings could diminish as the costs associated with travel and housing will be far greater than "tuning in at home" (Bell, 2003).

Streaming media is a rich and powerful tool that is being used more and more in education today; however, the future of this technology could virtually change the way students learn, courses are taught, and how students interact with others and the world around them. Although this has been said about many technological advancements in regards to education, increased student enrollment has many campuses and schools running out of room to house students and classes. The use of streaming video and streaming media may be a solution to their dilemma.

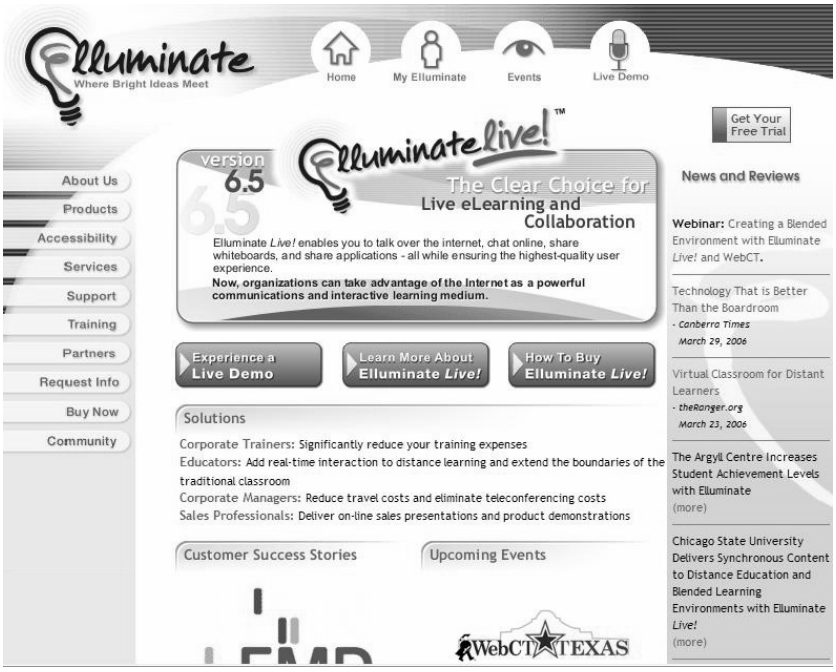

Figure 1.

Figure 2.

Figure 3.

Figure 4.

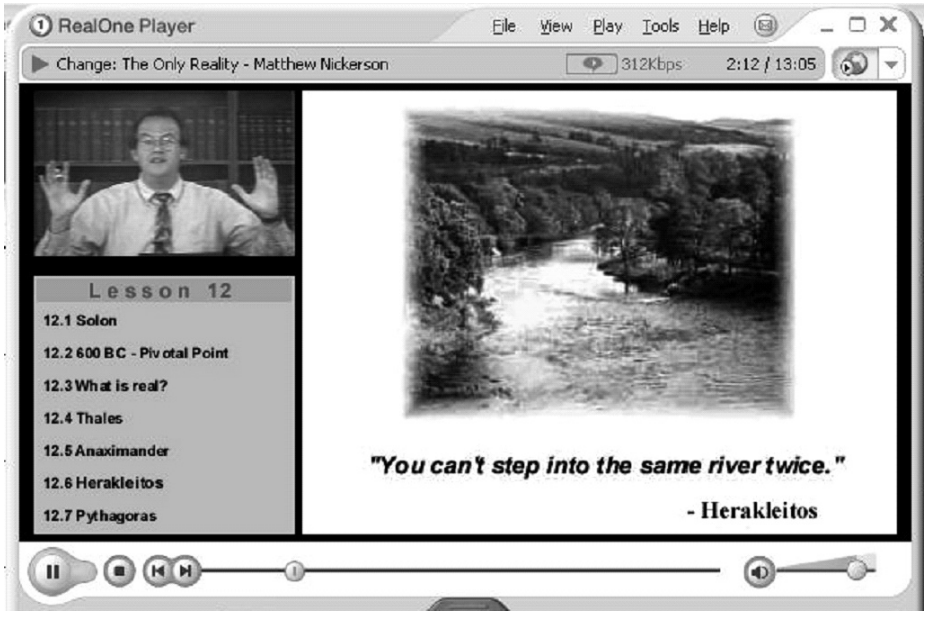

Figure 5.

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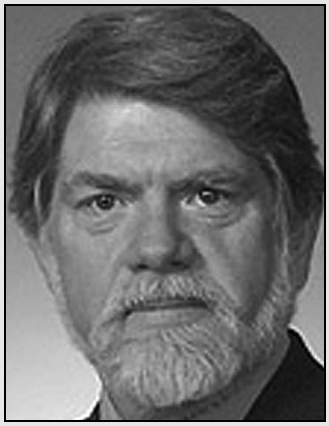
Rewind the Teacher

A Case for Technology

Robert L. Hale and Alex Heiphetz

When you hear the words "DVD set for an educational course," the first thing that comes to mind is that this is material for distance learning. However, increasing numbers of educators from traditional schools and programs experiment with hybrid courses that include both in-class and distance learning components (Ehmann & Hewett, 2005).

"Analysis and Interpretation of Statistical Data in Education" is an introductory course in quantitative methods as they are applied in educational research. This course has been taught by the same instructor using a traditional lecture format to a broad range of students at the Pennsylvania State University for over 25 years. The first author taught this course using a new format for the first time during the Summer Session I, 2006. The core of the new course is a set of nine DVDs that contain videos of lectures as well as important nonvideo material. The nonvideo material includes a Java-based statistical software package, links to relevant Web sites and research papers, as well as online quizzes and the traditional PowerPoint slides that are used to outline the lectures. The DVDs also link to Web forms where students indicate when they complete viewing and reading assignments, and



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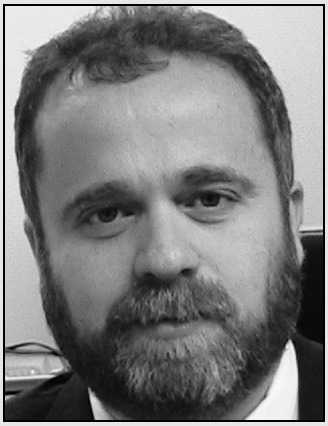

Alex Heiphetz, President, Delta L Printing and Media Services, State College, PA 16801. Telephone: (814) 234-0900. E-mail: alex.heiphetz@deltalprinting.com

their level of understanding that material. Each DVD also includes an e-mail link so that students can e-mail questions to the instructor at any time. A textbook, and a manual that includes several examples of examinations that have been given in the course, supplement the DVDs. Using this material, the class has changed from the traditional lecture format to technology-mediated instruction.

There are certain advantages inherent in "technology-mediated instruction," as noted by DeLacey and Leonard (2002). Among these advantages are: (1) taking learning out of the classroom, (2) preframing the debate, (3) the creation of experiential learning environment, (4) better accommodation to less verbal students, as well as others. In this course, the new format has completely eliminated in-class lectures. Students arrive at the regular scheduled class period after completing their learning assignments using the DVD and texts. They have listened to the lecture (often repeatedly), read the textbook, and taken a self-evaluation quiz before they come to class. Thus, class time can be used to explore more complex facets of the topic at hand, answer individual questions, and apply this new knowledge to solving specific problems posed by students. The student's knowledge, which is now discussed face-to-face, has enhanced the classroom experience. This new format has engaged students and encouraged them to learn from a vast set of resources available not only within the courseware, but outside it as well. Using the DVDs, it is easy to take students directly to relevant outside Web sites, directly load PDF and MS Office documents into their computers, and send information directly to the instructor using e-mail and PHP forms.

These opportunities and advantages do not come without significant challenges that must be faced by both instructors and students. These challenges are discussed in the remainder of this article.

Instructional Design

To effectively design a distance learning or hybrid course, an instructor must understand the delivery medium, as well as differences between how young and older students learn. Regardless of the learning mode you select: synchronous (such as a Web conference) or asynchronous (such as DVDs and printed materials), there is a significant difference in feedback using these newer formats compared to traditional training. Using the new formats, feedback is more controlled and verbalized and, as such, is less informative. Even experienced instructors often find themselves disoriented by the differences in feedback they receive during distance learning compared to the feedback they became accustomed to in a regular classroom. One of the ways to mitigate this disadvantage is to address it during the course design phase. You should always attempt to provide structured explanation and clarifications. At the same time, you need to allow plenty of opportunity for feedback and questions. These opportunities can be made available to students through the use of e-mail, electronic bulletin boards, or other means.

Courseware Preparation and Production

At the present time, there are few, if any, course materials designed specifically with hybrid or distance learning models in mind. Chances are, you will need to design these educational materials on your own. If you can significantly alter some existing courseware to fit this delivery model, you will save yourself some development time. On the positive side, technology allows you to easily incorporate existing material such as relevant video, Web sites, and research papers into your course. Please be careful with copyright issues here. Educators cannot rely on "fair use" policy today as much as they have done in the past. It may be best to provide links to those existing materials as opposed to directly includ-

ing them on your DVD. If you include someone else's work on your DVD, you will need permission of the copyright owner. Depending on your experience and willingness to experiment with technology, you may elect to create all the courseware, including video and Web pages yourself, or you might contract with a specialized company to assist with the technical parts. To start building a hybrid course, we recommend the following:

- Taping lectures might be a first step in creating your course. A well-developed course, however, includes more than just videotaped lectures. You probably want to develop interactive DVDs. We have had great success on both the PC and Macintosh platforms using DVD@ccess to make interactive disks. If your DVD is interactive, you can incorporate streaming videos, PDF and MS Office documents, links to relevant Web sites and online examinations, electronic bulletin boards, and a Frequently Asked Questions section for your course. You should definitely incorporate some of all of these types of assets into your material.
- Be prepared to modify your courseware often. Just as you would add or remove something when teaching a traditional course, a hybrid or distance learning course will require frequent modifications. One of the disadvantages of including relevant Web links on your DVD instead of incorporating the material directly onto the DVD, is that this leaves the stability of your course material in the hands of those people who maintain the other Web sites. You will need to check these outside links frequently to make sure they are still active. You may want to have your own Web server where you can write pages linking to outside information and maintain those pages yourself. Thus, if an outside Web page goes missing, you don't need to change the DVD, you simply rewrite your Web page to take care of this change. Correspondingly, the company producing your manuals, DVDs or other materials must be able to produce them on-demand, and modified according to your schedule.
- Unless you want to get into the business of manufacturing and distributing courseware, the courseware provider should be able to both produce on-demand and fulfill orders. This also means that your courseware provider does not necessarily need to be a local vendor. Today, students are quite comfortable with ordering materials online and having them shipped. In fact having an online ordering system is a benefit even when your provider is local. In an on-demand production situation, this saves students a trip to the store.
- The challenge of supplying students with all the necessary courseware in a timely manner means that you must schedule, notify, and enforce a timeline for both the courseware provider and the students. It is advantageous to contact students enrolled in classes before the first meeting to alert them to the way the course will be taught, and to let them know how to get their materials ordered. Typically an instructor can send out a form e-mail to all the students enrolled in the course with this information before the first class meeting. It is also important to notify the courseware producer, letting them know about how many units they can expect to be ordered, and when the class will begin. With this information, the courseware producer can better manage their time in the shop.

Along with the innovative approach to teaching this course, we tested a new training management system offered by Delta L Printing. Delta L Printing is a media production and software company located in State College, Pennsylvania. The few bugs that were discovered in the materials dur-

ing the summer session were fixed as they were found. For the fall semester, these newly corrected materials were manufactured—a feat that would be impossible with the traditional courseware manufacturing process.

Technical Support

Both the instructor and students will encounter technical problems. In our culture, instructors are socialized to have answers to all students' questions, and students are socialized to turn to the course instructor for answers to all course-related problems. In distance and hybrid learning this socialization may lead to disastrous results. Both students and instructors should be re-educated to understand that only subject-related questions should be addressed to the instructor. All technical questions are then addressed either to technical support (courseware malfunction/computer/Internet etc.) or to administrative support staff (course requirements/dates etc.). If this advice is not followed, you run the risk of instructors spending most of their time trying to fix somebody's computer or DVD player without the skills needed to do so. Your courseware provider should be able to offer technical support to your students. Technical support staff should be available to students via e-mail, bulletin board, and over the phone at reasonable times to help with technical questions. Having bulletin board communication and a Frequently Asked Questions section on your course Web site will help communicate with your students and save a lot of time, effort and frustration for both students and technical support staff.

Compared to distance learning classes that generally attract a more mature audience, resident students are typically more comfortable and have noticeably fewer problems using technology. Our experience with distance learning suggests that it is not uncommon to have 1 to 4% of the distance learners who are in nontechnology courses to be unfamiliar with using technology in their learning. They will often be initially frustrated in their efforts to learn using the new formats. For example, it is common for some students to attempt to play DVDs in their CD drive. In our experience, technical support should be ready at the beginning of a course to solve these problems. With younger students, the use of technology has been more familiar, and its use has essentially blended into the background, letting the course subject matter occupy center stage. It should be noted that in a regular classroom, a significant amount of technical support takes place informally through peer-to-peer interactions. Therefore, students in a hybrid course in which distance education materials are combined with classroom contact have an advantage compared to pure distance learning students.

Conclusions

This new format worked quite well. As one of the students in the Summer Session stated: "It's good to be able to rewind the teacher." Thirty-one students took part in the first class offered using the hybrid format. On average, they earned higher grades than the students who completed the course using the traditional lecture format. Subjective observations certainly support the idea that these students liked the new model and were quite happy with the format. There was not a single negative comment on the end-of-semester course evaluations from the students concerning the new format. Indeed, every comment concerning the hybrid format was positive. Enrollment in the course for the fall 2006 semester is around 150 students. As we near the fourth week of the semester, all student comments about the format have remained positive.

In certain aspects, today's academia differs only slightly from its medieval beginnings. Lectures and quizzes still make up the bulk of the educational process. Today,

many schools and training companies look for opportunities to offer distance learning and hybrid educational classes in an attempt to expand their reach and to provide better learning experiences to students. We owe it to ourselves and to our students to explore the prospects offered by this format.

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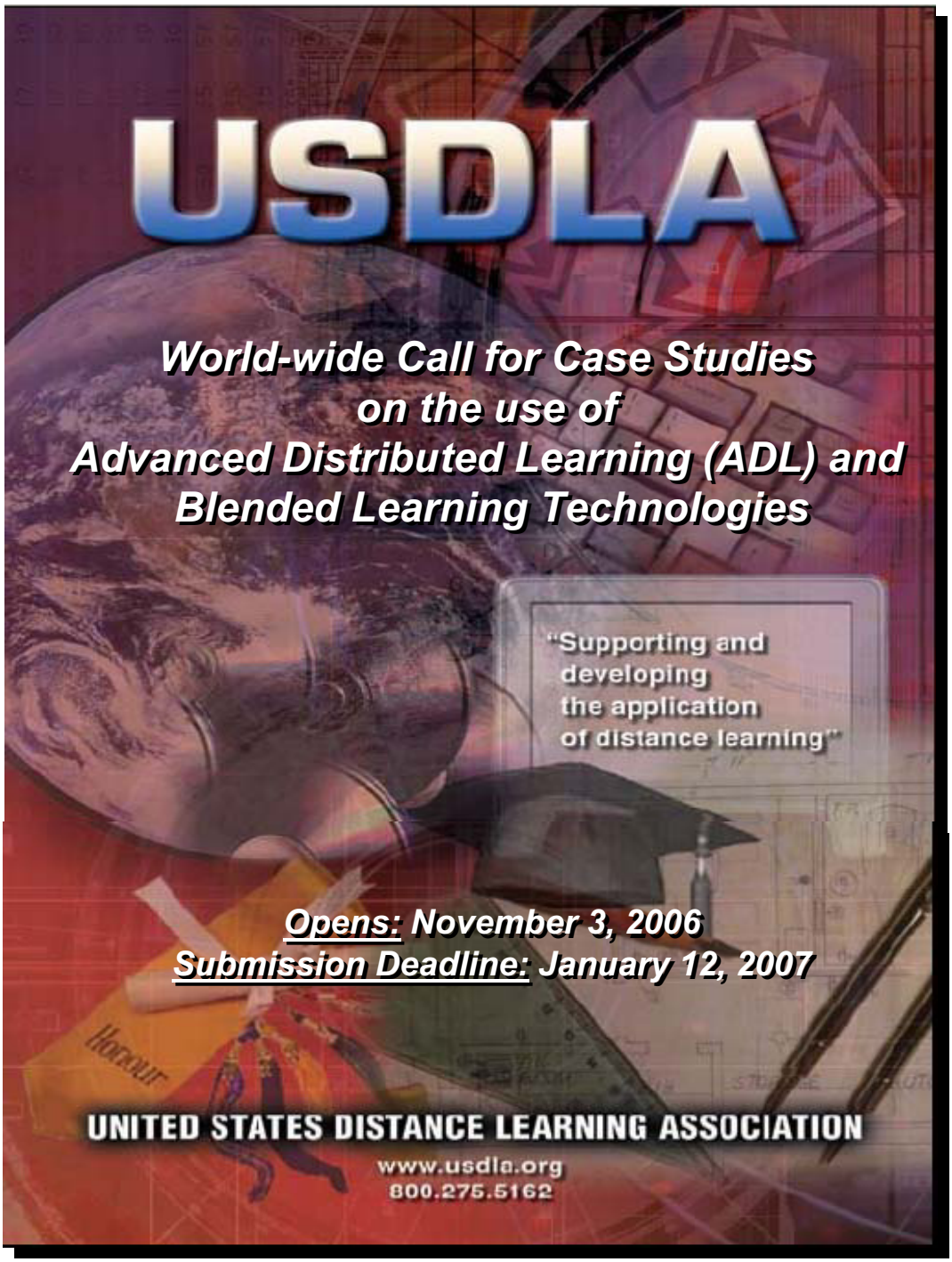
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on the use of
Advanced Distributed Learning (ADL) and
Blended Learning Technologies
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World-wide Call for Case Studies on the use of Advanced Distributed Learning (ADL) and Blended Learning Technologies

***Case studies should be submitted by* Friday, January 12, 2007.**

The United States Distance Learning Association (USDLA®), the nation's premier distance learning association and the Advanced Distributed Learning (ADL) Initiative through a new, related virtual community called "adlCommunity.net" is issuing a call for case studies **beginning November 3, 2006,** covering Advanced Distributed Learning (ADL), Sharable Content Object Reference Model (SCORM®), Content Object Repository Discovery and Registration Architecture (CORDRA™), and Blended Learning. ADL is a collaborative effort between government, industry and academia to establish a new distributed learning environment that permits the interoperability of learning tools and course content in the estimated $2 trillion (US) global education and training market space.

These case studies will be published in an upcoming special issue of USDLA's *Distance Learning...A Magazine for Leaders*. The magazine is a high quality print publication for those who practice the growing field of distance education and training. The emphasis for *Distance Learning* is on current issues and trends in the field, with special consideration given to practical applications of distance learning. *Distance Learning* is not a research publication but rather, is a practitioner's publication containing well thought-out and practical ideas for the field.

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ADL technologies help those who support the ADL Initiative expand new markets for training materials, reduce the cost of development and increase the potential return on investment. Platforms conforming to SCORM and content reusability are considered essential for the sustained investments necessary to create the dynamic ADL environment.

The following are several technology areas the USDLA seeks case studies in:

Sharable Content Object Reference Model (SCORM®)
SCORM is a collection of specifications adapted from multiple sources to provide a comprehensive suite of e-learning capabilities that enable interoperability, accessibility and reusability of Web-based learning content.

CORDRA™
Content Object Repository Discovery and Registration Architecture (CORDRA) is an open, standards-based model for how to design and implement software systems for the purposes of discovery, sharing and reuse of learning content through the establishment of interoperable federations of learning content repositories.

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ADL Registry (ADL-R)
The ADL-R is a searchable index of content metadata that can be resolved to content located in distributed repositories. Initially the ADL-R will provide basic search functions, and services will be added as policy issues are addressed. The ADL-R is not a content repository. Searching the ADL-R is unrestricted. The primary purpose of the ADL-R is to provide a DoD-wide means and infrastructure to search, discover, and expose learning content. The learning content will be managed as content objects, each with a unique identifier. The ADL-R is designed to provide an agile knowledge base for all content contributors. In addition, this infrastructure is expected to be a useful and authoritative life-cycle management tool for knowledge management DoD-wide.

Performance Aiding
Performance Aiding (also called Performance Support) is one of the approaches being used to support transformation. This includes improved human user-centered design of equipment and even the replacement of the human role through automation as well as new technologies for job performance as examples of the transformational tools that are under investigation to bridge gap between training, skills and performance.

Gaming / Game-based Learning
Games for distributed learning are complex systems with three major components: 1. Activities with formal rules in which players engage in artificial conflict with variable and quantifiable outcomes and both game play and learning objectives 2. A narrative which provides cues, context and relevance for the activities and 3. A simulation which represents the learning space necessary to support the activities and narrative.

Simulations
A simulation is a representation of a system presented over time. Simulations have advantages over real operational systems in training, including: elimination of catastrophic consequences of error; reduction of physical danger; cost containment; elimination of non-salient attributes; "re-play" possibilities; compression or expansion of time; iterative manipulation of variables for evolving design and data collection.

Intelligent Tutoring
Intelligent tutoring systems (ITSs) are computer software systems that seek to mimic the methods and dialog of natural human tutors, to generate instructional interactions in real time and on demand--as required by individual students. Implementations of ITSs incorporate computational mechanisms and knowledge representations in the fields of artificial intelligence, computational linguistics, and cognitive science.

Blended Learning Solutions
Blended learning is instruction using multiple media. Although appearing somewhat all-encompassing, this definition includes the integration of instructional media into a traditional classroom or into a distance learning environment. Blended learning can include any combination of media that supports instruction, regardless of the mix of synchronous or asynchronous media. The economy of scale and power of blended learning is derived from its “elasticity”: the ability to integrate a variety of synchronous and asynchronous media allowing the instructional designer to attain the most appropriate blended learning solution.

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In addition to the technology areas noted these case studies should be categorized by one or more learning, education and training communities:

- Corporate
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Twenty Essential Questions for Deciding if Your Organization is Ready for E-learning

Ryan Watkins

E-learning takes on many forms and functions in organizations. Although e-learning is often closely associated with Internet-based training, the true range of e-learning delivery options is much broader (such as Internet, CD, DVD, satellite, digital cable, PDA, and Blackberry), as are the types of e-learning events (such as seminars, job aids, tutorials, audio books, quizzes, and study guides). That's why e-learning in your organization may include such diverse opportunities as brown-bag lunches facilitated by desktop video or certification programs delivered on DVDs. This diversity also highlights why e-learning decisions must be based on holistic (or systemic) business models (Watkins & Kaufman, 2003).

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Making practical decisions requires multiple perspectives on what e-learning can and cannot achieve for your organization. Both a systemic model for ensuring that all e-learning activities lead to useful results and a holistic framework of a complete e-learning system can be useful tools as you try to determine if your organization is ready for e-learning. Even if e-learning in your organization will include just a few vendor-purchased online courses,

assessing your organization's readiness for e-learning multiple perspectives is an essential step toward success.

As a foundation for making useful decisions, begin with a model for aligning all that you and your organization uses, does, produces, delivers, and contributes. This gives you a valuable systemic perspective on e-learning success—aligning inputs, processes, and results. Use the Organizational Elements Model as a framework for viewing these relationships (see Table 1). The Model helps you to align the resource that you use (i.e., inputs) and the activities that you participate in (i.e., processes) with the results that you create (i.e., products), the value they add to your organization's deliverables (i.e., outputs), and the expected contributions of clients, community members, and others (i.e., outcomes).

The Organizational Elements Model helps you relate and align organization resources, activities, and results. Yet, because e-learning initiatives are complex systems with many variables critical to their success, you will want to also view your organization's readiness from a second perspective. This second, e-learning specific, perspective adds structure and context to your readiness decisions. From this perspective e-learning initiatives are viewed in relation to eight distinct, yet closely related, dimensions (based on Kahn, 2005 and Watkins, 2006). These dimensions are:

Organization—focuses on the alignment of results at the individual/team, organizational, and societal levels (accomplishing results that contribute to success at each level is essential).

Pedagogy—refers to issues related to goals/objectives; design approach; instructional strategies and tactics; e-learning activities; formative, summative, and goal-free evaluation; and media selection.

Table 1
The Organizational Elements Model

Level of Results	Focus	Examples
Societal outcomes	Results to be contributed to external partners, clients' clients, and the shared society.	• Profits over time (not just one-shot) • Self-sufficient citizens • Zero disabilities from accidents • Zero starvation
Organizational outputs	Results to be delivered by the organization to external clients.	• Delivered vehicle • Discharged patient • Competent graduate • Dividends • Unpolluted exhaust
Individual/team products	Results to be produced by individuals or teams for internal partners and clients.	• Delivered technical advice • DVD training materials • Manual for executive coaches • Component of automobile brake system
Processes	The activities or steps used within an organization to accomplish results	• Training • Designing courses • Formatively evaluating materials • Managing
Inputs	The resources or assets used within an organization to facilitate processes	• Servers • People • Satellite dishes • Money

Source: Based on Watkins (2006) and Kaufman (2006).

Technology—comprised of infrastructure planning and installation, as well as hardware and software issues.

Interface Design—focuses on all aspects of how the learner interacts with the learning technology, instructor, and peers in the learning experience (e.g., Webpage design, videoconference layout, content design, navigation, and usability testing).

Evaluation—relates to issues concerning assessment of learners, return on investment, and formative evaluation of instructional materials (i.e., finding what works and what doesn't, so results can be improved upon).

Management—focuses on successful maintenance of learning environments, distribution of information issues, management of personnel, and leadership.

Resource Support—examines issues related to online support and resources for learners, instructors, developers, administrators, and others.

Ethical—evaluates issues of plagiarism, social and cultural diversity, geographical diversity, learner diversity, information accessibility, etiquette, adding measurable value to our shared society, and legal issues.

By applying both of these tools (the Organizational Elements Model and the eight dimensions of a complete e-learning system) you can gain a holistic perspective of e-learning within your organization. Out of them you can also derive many questions that should be asked (and answered) before deciding if your organization is ready for e-learning. Below are the 20 essential questions I have found to be most useful when working with organizations.

Organization

1. Is the organization committed to the long-term success of its clients, clients' clients, and others in our shared society?
2. Is the organization committed to the contributions made through the professional development of its associates?
3. Does the organization integrate e-learning as part of the long-term strategic plans?
4. Have the required results for continuing organizational success been linked to the capabilities of e-learning solutions?

Pedagogy

5. Will training content be based on formal job/task/performance analysis?
6. Will e-learning content and activities be linked to the accomplishment of results by learners after the training?
7. Will e-learning courses be aligned with other e-learning (and non e-learning) courses to ensure synergy?

Technology

8. Will e-learning technologies support a variety of media technologies (e.g., video, audio, synchronous, asynchronous)?
9. Who will maintain the technology infrastructure for e-learning?

Interface Design

10. Will the e-learning interface provide learners with visual information on their progress and offer opportunities to create long-term learning plans?

Management

11. Will the training team have adequate experience, knowledge, and skills to develop interactive e-learning materials and learning environments?
12. Will e-learning instructors receive training on using the e-learning tech-

nology and interacting with learners online?
13. Will instructors have time to provide individualized feedback to learners throughout the e-learning course?
14. Will associates taking courses have the e-learning study skills and technology experience necessary for success in this new learning environment?
15. Will associates taking courses have the work-release time (and supervisor support) to be successful in their courses?

Resource Support

16. Will associates taking courses have access to specialized technology support personnel (as well as content support staff)?
17. Will the training developers have access to the design and development technologies (e.g., digital media converters, course management system) necessary to create useful learning experiences?

Ethics

18. Will the organization develop and communicate comprehensive plagiarism and/or code of conduct policies regarding e-learning?

Evaluation and Continual Improvement

19. Will e-learning courses have time and resources for formatively evaluating all courses so improvement can be made prior to release?
20. Will the e-learning initiative be evaluating for accomplishing results that align all that the organization uses, does, produces, and delivers with the desired contributions of external clients and society?

Conclusion

When trying to decide if e-learning is the "right" tool for your organization, take time to make certain that desired results are going to be achieved. You can use the five levels of the Organizational Elements Model to verify adequate alignment of e-learning activities with desired results, and the eight dimensions of e-learning systems to provide a complete outlook. In addition, by asking important questions around each of these, you can estimate the readiness of your organization for e-learning success. The 20 essential questions provided above are only a starting place in planning for successful e-learning; add your own questions for each of the eight dimensions—and remember to align all that you use, do, produce, and deliver with valuable contributions to clients, external partners, and society.

References and Related Readings

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Wiki Nation

Craig Ullman

The word "wiki" may be so new for English, my spell check insists it's a typo, but this little Web application has profound implications for education, publishing—even defining the truth.

Although many assume it's an acronym or a neologism, "wiki" is derived from the Hawaiian "wiki wiki," which is an adjective to describe something "quick" or "fast" The word has quickly permeated the English language, but the definition now refers to the concept of a collaborative writing application on the Internet.

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Wikipedia (where I found the definition of "wiki") is by far the biggest wiki, and also a completely typical one. Someone—anyone—writes the first draft of an article that you'd normally find in an encyclopedia. Another anyone edits it, another anyone edits that, and so on, until (presumably) all these refinements add up to the closest version of the truth humans can divine. There is no guiding hand, no managing editor, no authority whatsoever. If you disagree with something, just rewrite it and leave it for the next person to clean it up.

This idea is, of course, completely antithetical to everything we value as Americans. It is true that the wiki concept seems very much like an actualization of a "marketplace of ideas"; the most accurate and complete entry, like the best jar of pickles, will eventually dominate the market until something even better comes along.

But Wikipedia—in fact, the whole concept of a wiki—strikes at the heart of our primary value: individualism. The idea that collective intelligence is more accurate than the insights of a single gifted writer (or at least someone with a PhD), strikes us as unlikely, even bizarre.

Moreover, a wiki is based on *altruism*, a totally alien concept for us individuals. Who cares if I know more about … ah, pickles … than the guy(s) who wrote the pickle article? Why would I share my knowledge? *What's in it for me?*

Well, some vague ego gratification that no one else would ever really know or care about, but otherwise—nothing. Yet collective intelligence and altruism are what drives wikis, and it seems to be working: a recent study by the magazine *Nature,* reviewing 42 science articles, determined that the average Wikipedia article had 4 errors in it, while Encyclopædia Britannica had 3. Pretty good results, considering Wikipedia started in 2001, while the Britannica folks have had since 1771 to get their act together, and that the Wikipedia articles typically are significantly longer than Britannica articles on the same subject.

My point here isn't to denigrate Britannica. Clearly, the concepts of authorship and authority have lasting value (my name's on the bloody column, after all). However, I'm making a different point: why do we assess individual students but not the whole class? Why do we assess individual student portfolios and not (with a few exceptions) projects the entire class do together?

Currently, any discussion of a class's performance is purely a means of grading the teacher—as if the interactions among the students, and the variations between classes, don't really matter. Instead of each student writing a report, maybe they should all write one report.

The very idea of grading an entire class, of looking beyond our individualist blinders, seems antithetical, even nonsensical to us. But the atomization and radical libertarianism that the Internet seemed to encourage initially might be morphing into some different and more interesting kinds of social organizations that need to be reflected in our thinking about education.

In any case, the choice between assessing the individual or assessing the group does not have to be an either/or. We can, and should, look at both levels. We can, and should, think more about how we can leverage the knowledge and interests of each student to create a better result for the whole group.

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students working full-time should not enroll in more than 2, possibly 3 online courses at one time.

- DeRoT 3: A three-credit college course, taught at a distance should require students to commit about 8-10 hours per week during a 15-week term.
- DeRoT 4: Instructors facilitating threaded discussions should make about 1 posting for every 4 student postings early in a course and gradually reduce postings to about 1 in 10 near the end of the course, as students take on more responsibility for their own learning.
- DeRoT 5: Threaded discussions, when graded, are valued more highly by students. A student should make at a minimum at least three postings for each threaded discussion question—one in direct response to the question, one posting in response to another student's posting, and one in response to what other students have posted in order to build a thread.
- DeRoT 6: One instructor, working alone teaching an online class, should have about 20 students, give or take five (actually, this rule of thumb is supported by research reported by Anymir Orellana in volume 7, issue 3 of the *Quarterly Review of Distance Education*).

Send us your DROTs; certainly there are others. Then, let us get someone to conduct research to move from the rules of thumb practiced by crafts, to the research and theory supporting best practices used by professions.

And finally, an important "rule of thumb" for column writers is to *keep it short!*

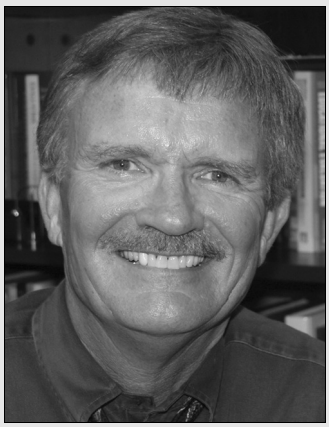
DeRoT 3: A three-credit college course, taught at a distance should require students to commit about 8-10 hours per week during a 15-week term.

Rules of Thumb, or DeRoTs

Michael Simonson

We all have heard of the phrase "rule of thumb," or "rules of thumb." Generally, this means a widely applicable process that is often used, even if it is not always.

It is often fun to try to find out where phrases like "rule of thumb" come from. In today's world, if a person wants to find something out, they often "Google it." (Do you suppose in 100 years someone will write about googling and wonder where that funny word came from?).



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At any rate, if you Google "rule of thumb" you will find there are many explanations about where the phrase came from—everything from violence (proper thickness of a stick used to discipline someone or something), to physical measurement (distance between the base of the thumbnail and the first joint is an inch), to wind measurement (raising a wet thumb into the air), or to setting a table (in order set a row of plates one places the thumb on the edge of the table and extends it).

My personal favorite is how brewers use of "rule of thumb." For makers of Pete's Wicked Ale, the phrase was attributed to the practice of dipping a thumb in the ale to determine if the beer wort had cooled to the proper temperature for adding yeast.

Distance education is beginning to develop its "rules of thumb," also. It may be a sign that not enough research is being conducted in the field—but still, rules of thumb do have a certain amount of value when decisions need to be made. Several DeRoTs are being applied by distance educators. (A DeRoT is a Distance Education Rule of Thumb.)

- DeRoT 1: One instructor can be responsible for 2-4 distance-delivered courses at a time.
- DeRoT 2: A full-time student can successfully participate in 4-6 online courses at one time. On the other hand,

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