INTERNATIONAL JOURNAL OF INSTRUCTIONAL TECHNOLOGY AND DISTANCE LEARNING

August 2008
Volume 5 Number 8

ISSN 1550-6908

PUBLISHER'S DECLARATION

Research and innovation in teaching and learning are prime topics for the *Journal of Instructional Technology and Distance Learning* (ISSN 1550-6908). The Journal was initiated in January 2004 to facilitate communication and collaboration among researchers, innovators, practitioners, and administrators of education and training involving innovative technologies and/or distance learning.

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International Journal of
Instructional Technology & Distance Learning

Vol. 5. No. 8.

ISSN 1550-6908

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Editorial

The Business of Learning

Donald G. Perrin

Popular sayings like “you get what you pay for” are used to rationalize failure. The assumption is, if you spend more money, you get a better product. Not so. Marketing gurus have discovered that, up to a point, if you increase price you make more. Beyond that point, buyer interest diminishes rapidly. That is why a packet of Corn Flakes costs $3 to $5 yet the raw ingredients cost a few nickels. Your price is what the market will bear. It is true, there are processing, packaging, shipping and inventory cost, but the true value is much lower than the market price. You continue to buy at slowly increasing prices until you reject it as “too expensive”. You are then wooed back by sales and discounts. Regardless of the price you pay, the product is the same.

Education does not fit this model because it requires human services by qualified teachers, counselors, administrators and other specialists. Even the best endowed private schools and universities subsidize tuition by 200-300%. Private and public education at all levels is struggling to provide quality education and contain the soaring costs. Many of these costs come from government regulation; others result from business and educational strategies that are inadequate in 21st century. It will require a paradigm shift to remove baggage from a century of growth and raise learning to a higher level.

The twentieth century education model was like a factory assembly line for batches of 25-40 students. In the early part of the century, emphasis was on developing “hands”, people with basic skills that would be compliant to the needs of business, industry and military organizations. After World-War II, seeds of technology and research from wartime training led to significant new theories and practices to improve education. This was further stimulated when the Soviet Union launched Sputnik I on October 4, 1957.

The United States government funded new curricula in science and mathematics, new instructional technologies, and new methods of teaching. There was a decade of experimentation and growth before diminishing funds caused many classrooms to return to traditional methods of teaching and learning. Renewed growth resulted from Computer Based Training in the 70s, Personal Computers in the 80s, Internet Browsers in the 90s, and powerful Search Engines that heralded the Information Age and the new millennium.

Classrooms continue to resemble those of a century earlier in their pedagogy and physical appearance. Many have changed from homogenous grouping to a diversity of cultures and ability levels, larger classes, students with disabilities, technologies without proper training and support, and program changes dictated by politicians. Education is being asked to do more with fewer dollars. Band Aids are inadequate for the failing infrastructure. It is time to take stock and rethink education as we know it.

Education needs to be the pre-eminent industry of the new millennium. Currently, it has fundamental problems related to mission, competencies, and relevance for life in the 21st century. The solution requires public support for: research and innovation, relevant teacher training and curriculum, expanded resources for schools, colleges, universities, and lifelong education, and restoration of control and trust to educational leaders.

Editor's Note: This paper provides competent and focused concepts, research and implementation of the Webinar Distance Learning format for continuing education in pharmacology. This study provides excellent guidance for application of webinars in other medical related fields.

Online Webinars for Continuing Medical Education: An Effective Method of Live Distance Learning

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USA

Abstract

Continuing education for the medical professions has long been held in traditional face-to-face classrooms. However, special populations such as those located in rural and remote areas may not have access to these live events. This study sought to identify an effective online delivery method using instructional methodology to offer accredited education.

In this study, the courses developed were examined by the affective response of students that participated. In addition, a literary research was completed to determine the qualities that make a good candidate for this distance education, identify topics that are in need of additional training, and assess the techniques and methodology to provide continuing distance education.

Keywords: Distance Education, Continuing Education, Webinar, Synchronous, Online Education

Introduction

In 1965, the state of Florida was the first to implement mandatory continuing education for pharmacists and pharmacy technicians. Today, all 50 states except for Hawaii require them to participate in accredited continuing education (Driesen, Verbeke, Simoens, & Laekeman, 2007). The Accreditation Council for Pharmacy Education (ACPE) sets accreditation standards and accredits continuing education providers, rather than individual continuing education activities (ACPE, 2008). This study extends to measure the effectiveness of its programming by conducting affective assessments to determine the quality and potential of each program, the instructional methodology implemented, and the delivery format utilized.

The study focused on the design and delivery of pharmaceutical distance education. This was selected as the subject matter of the study because pharmacists and pharmacy technicians are required by state law to participate in continuing education to maintain their medical license. All of the courses in the study were developed and approved in conjunction with ACPE guidelines.

The medical topics for the courses of study were selected from focus groups of pharmacists and an industry analysis of new medications and treatments to be released in the pharmaceutical market. A team of student matter experts, instructional designers, and multimedia production specialists developed the online programs. Pharmacists and pharmacy technicians world-wide then studied the programs. The students in the study included retail, corporate (managed care), health care facilities (hospital, skilled nursing facility, etc.), research institutes, marketing firms, and members of the military.

Instructional Design Process

The implementation of distance learning technologies requires careful planning. The figure below (Figure 1) illustrates the major phases in the implementation process.

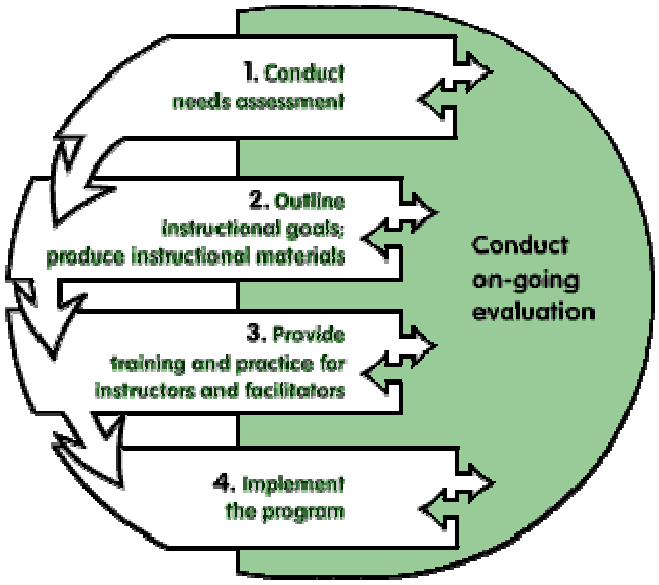

Figure 1. Instructional Design Model

The Florida Center for Instructional Technology recommends the following steps for proper techniques of implementing distance education (Barron, 1999). The first step is to conduct a needs assessment. The needs assessment identified the topics to be taught, the requirements and forms to be competed to receive ACPE accreditation for each course. The analysis also identified the technical requirements of the webinar format.

The needs analysis was to determine the pharmaceutical topics and concerns which pharmacists requested training in. A review of public health issues of concern in the media was air pollution (e.g.: emissions and diesel fuel). Air pollution can affect health in many ways with both short-term and long-term effects. The United States Environmental Protection Agency (EPA) reports that national average air quality continues to improve as emissions decline through 2006 (EPA, 2008). Therefore it is important to continue efforts to improve the quality of the air to help prevent chronic illnesses like asthma. The asthma webinar was developed to address these environmental concerns and the short-term and long-term effects they can have on people. Additionally, research of national health data shows an increasing trend of chronic diseases. The Centers for Disease Control and Prevention (CDC) report of Behavioral Risk Factor Surveillance System (BRFSS) is the world's largest telephone survey that tracks health risks in the United States. The data show an increasing trend of diabetes, hypertension, and lack of patient management skills to control their disease (CDC, 2005). Finally, pharmacy focus groups and survey questions asking what other educational programs they would like to be offered identified the remaining educational courses in the study.

The next step was to outline instructional goals and objectives and produce the instructional materials. A well-structured distance learning course must place instructional objectives foremost (Barron, 1999). The objectives for each course were established and subject matter experts developed the content for the webinars. All of the materials were approved by a licensed medical doctor before being released to the students.

The technology should be as invisible as possible, just another tool that instructors can use to effectively convey the content and interact with students (Barron, 1999). The technical requirements to produce and deliver the content were established. The webinars consisted of a pre-recorded audio lecture and PowerPoint presentation that was hosted online. At a certain time,

students would login to the website to participate. The website also had a chat room and discussion area to ask the instructor questions or to request technical support.

The third step of the process provided training and practice for instructors in the webinar courses. The live webinars required an instructor to participate in the question and answer sessions. Many of the techniques and skills used in a classroom teaching situation do not translate directly into a distance education approach. Instructor training programs are important to acquaint the instructor with the use of technology as well as to help with the re-design of the instructional strategies. The course instructor was trained in understanding distance education and how to operate the webinar software. The instructor improved his delivery and instructional methods with each webinar.

The final step is to implement the program. After the training is complete and a pilot test has been conducted to ensure the technology is functioning, the programs were implemented. The feedback from students was collected and accreditation paperwork was filed. The ACPE paperwork included the letter of agreements, faculty review, and beta testing to determine the amount of continuing education units to assign to each course of study.

During this whole process a constant, on-going evaluation was conducted to provide quality assurance. This process extended to the delivery of courses that are medically correct, technically savvy, and provided a constant stream of student feedback to address concerns as they occurred.

Methods

Research in distance learning has produced several methods of distribution for online learning. This study had to meet the need of the accreditation body to provide online education that could be classified as a "live" event so it would be ACPE accredited as one (1) live Continuing Education Unit (CEU). The distribution of the "webinar" met this need.

Webinar is short for web-based seminar, a presentation, lecture, or workshop that is transmitted over the Internet. A key feature of a webinar is its interactive elements, the ability to send, receive and discuss information among students and instructor. This is the strength of the webinar; the ability of students to interact with the content and ask questions in a group setting while everyone is located at different locations.

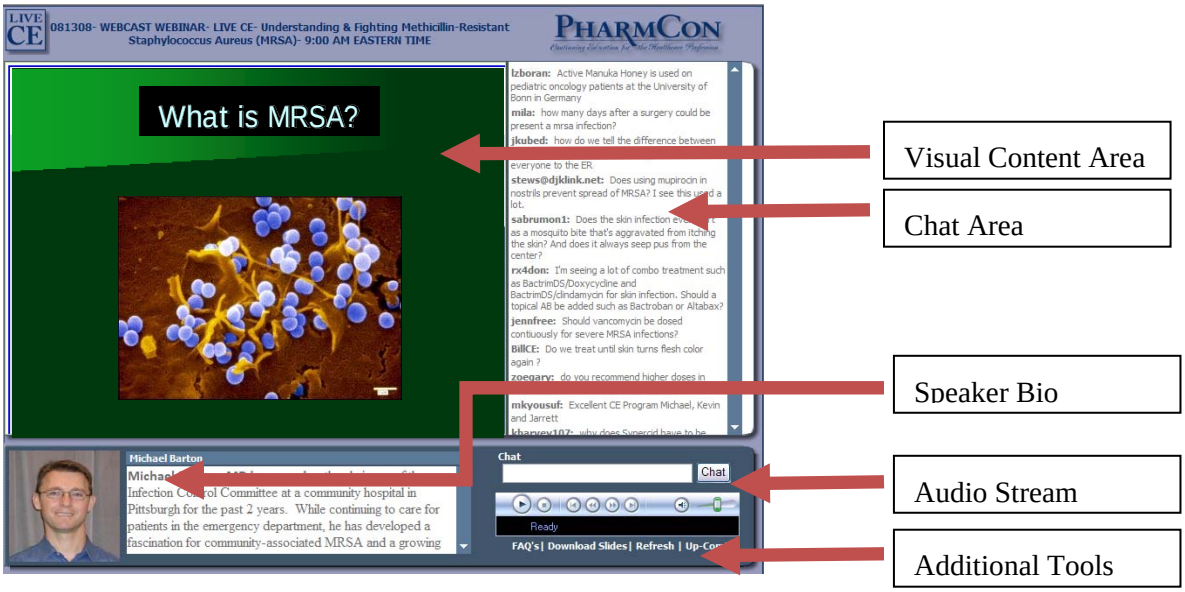

Figure 2. Screenshot of a webinar in progress

Figure 2 shows a PowerPoint slide area for the visual content on screen left and a chat box for students to ask questions on screen right. The lower left is a biography of the speaker and on the lower right is where the audio streams. In addition, on the bottom of the screen is where the student can seek technical help, download a copy of the presentation, refresh the page, and access the calendar of upcoming events.

There were four webinars in the study. Dates, title, and objectives for each are listed below.

The first webinar conducted on 3/21/07 was *Insulin Therapy for Diabetes*. The objectives were (1) Identify the mechanisms of action, pharmacology, and other important information for insulin therapy used to treat both types of diabetes and (2) Categorize the practical and essential information that has application in the daily pharmaceutical practice.

The next webinar conducted on 4/4/07 (and repeated on 5/2/07) was *Asthma: The Challenge of Children, Minorities, and Low-Income Populations*. The objectives were (1) Describe the highest risk asthma populations, (2) Outline the significant features of the asthma management guidelines, (3) Describe adherence issues and methods to overcome difficulties, and (4) Describe new advances in the diagnosis and pharmacological treatments of asthma.

The third webinar was conducted on 4/11/07 (and repeated on 5/9/07) was *The Pharmacist's Role in Treating Hypertension*. The objectives were (1) Enhance your understanding of hypertension to include cardiovascular risks, management, and goals for individual patients, (2) Review and discuss the current pharmacotherapy standards of care for hypertension, and (3) Describe the pharmacist's role in counseling patients on hypertensive medications.

The final webinar was conducted on 7/6/07 (and repeated on 7/11/07) was *Pharmacological Help for A Good Night's Sleep*. The objectives were (1) Define insomnia and characterize the symptoms and array of causes, (2) Describe traditional and newer pharmacologic approaches to the management of insomnia, (3) Evaluate the comparative efficacy, pharmacokinetics, and contraindications of agents used to treat insomnia, and (4) List strategies for pharmacists to educate and counsel patients with insomnia.

The research methods implemented in the study are an analysis among the research questions posed. This investigation consists of a review of pedagogical theories and literature, student affective assessments, and a review of the procedures to offer live online education.

Results and Analysis

The study sought to identify qualities in students that identify them a good candidates for distance learning courses. As identified in the research of Ornstein and Hunkins (1998) they identified these qualities. They include students that are self-motivated and self-disciplined, never (or at least rarely) procrastinate, resist constant distractions, feel alright about missing the social elements of traditional schools, communicate effectively through reading and writing, accept critical thinking and decision making as part of the learning process, meet the minimum technology requirements for the course, and feel that high quality learning can take place without going to a traditional classroom.

The convenience of distance education can attract many adult students since it is flexible and can accommodate various schedules (Thomas, 2008). However, it may not be the best fit for every student. An instructor or provider of education should include suggestions in the syllabus of ideal qualities for a student to have before enrolling into a course at-a-distance. This study provided potential students with the mentioned list of qualities and expectations for students to keep in mind while participating in distance education. This process helps student, instructor, and educational programs to succeed.

The analysis of student interest and successfulness of completing an educational course is important to understand the effectiveness of the program. The first research question in the study asked to determine the effectiveness of asynchronous learning on student performance. A survey of student interest was collected in the webinar programs. The webinars were delivered online between March and July 2007. The following statistics were obtained from the pharmacy webinar website, where users must login to access the information and this access is logged. The first three webinars focused on being accessible and easy-to-use since this was the first time that this technology was being implemented on a large international level with pharmacists and pharmacy technicians online.

The first topic to be addressed was *Insulin Therapy for Diabetes*. 460 people clicked on the link for more information, 390 (85%) registered for the program; 292 (75%) attended the session; 164 (56%) completed the course survey. The 25% that registered but did not attend the program were followed up with to find out why they did not attend. The reasons cited included: first time they used webinar software; internet connection problems; phone problems (calling in to conference call); and other technology problems (computer/access problems). Other reason cited were: the webinar was competing with popular television shows in the same time slot; family and work commitments;, and simply forgot about the webinar.

The next topic of the webinars was *Asthma: The Challenge of Children, Minorities, and Low-income Population*. There were 636 people that clicked on the link for more information; of those, 516 (81%) registered for the program. 314 (61%) attended the session and 174 (55%) completed the course survey. The 39% that registered but did not attend the program were followed up with to find out why they did not attend. They reported the same reasons as for the insulin webinar.

The final topic of the webinars was The *Pharmacists' Role in Treating Hypertension*. There were 460 people that clicked on the link for more information, of those, 390 (85%) registered for the program. Then 292 (75%) attended the session, of them, 137 (47%) completed the course survey. The 25% that registered but did not attend the program were followed up with to find out why they did not attend. The students that did not attend reported the same reasons as for the insulin and asthma webinars.

The study addressed the concerns cited by the students to increase recruitment and retention rates of the students. For students that were accessing incorrect websites, the webpage for the program was revised with clearer instructions and links. The webinars also included technical support by technicians being available online and on the phone for the students. This greatly reduced problems such as internet connection problems and other technology/computer-related problems. Also, the webinars were originally sending audio over the telephone but to address students' concerns the audio was streamed online. That way the students were not tying up the phone line for an hour or making a long distance call. As for competing with popular television shows, family, and work commitments the webinars were then offered on different times and days of the week so the students could choose which ones met their scheduling requirements the best.

All of the educational programs were very successful and scored very high for covering the objectives, applying to their practice/patient care, and overall evaluation of the activity. The students reported that the instructor did a good job of writing the programs and delivering the online lectures. It was interesting that the webinars attracted a younger population of pharmacists while the majority of the traditional mailer monographs were students 41 and older.

The students' satisfaction with each additional program increased. The instructional design model with a focus on a constant evaluation resulted in better and better continuing education programs as attention was made to keep increasing the quality of technology to deliver the programs and

the quality of the content of the programs. This focus on quality education resulted in students referring others to the courses and repeat students in the programs.

In summary, the webinar method was a preferred distance learning technique according to the students in the study. The webinars were a popular choice by the students. The data rated the webinars very favorably and when asked if they would return again, 99% responded that yes, they would return again for another webinar. Also, according to the surveys the majority of the students would recommend attending a webinar class to a colleague.

Conclusion

This study has conducted research of webinars, an emerging methodology and application that is growing in the field of distance education. The outcomes of the study provide data and information for educational policy and application changes within the academic community and also provide literature content for future publications and presentations. Finally, the study provides proof-of-concept of delivery and support to large numbers of students at a distance in pharmacology.

The online programs have especially been beneficial for members of the military. Several military pharmacists participated in the programs stateside and around-the-world. For example, several pharmacists located at the Ali Al Salem and Ahmed Al Jaber United States Air Force bases in Kuwait attended the webinars.

The students in the study benefited from access to accredited continuing education for those in rural and remote locations. They could benefit from learning the latest pharmaceuticals to be released in the marketplace and be educated on innovative patient consultation techniques. The public also benefits by having an informed pharmaceutical workforce who is aware of new medicines and treatment guidelines.

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Editor's Note: The computer, interactive multimedia, and the Internet provide a range of Information and Communication Technology (ICT) options for teacher training and student learning. This paper focuses on training teachers to use ICT for teaching and learning in special education classrooms. It points to deficiencies and opportunities to guide future development and implementation of ICT training for teachers, and ICT to enrich learning for special education students.

The Status Quo of Using ICT in Teaching among Special Education Teachers in Amman, Jordan Schools

Mayada Al-Natour, Hatem Alkhamra, Khalid Ajlouni
Jordan

Abstract

This study aims at evaluating the status quo of using ICT among special education teachers in Amman- Jordan schools. The study describes the extent to which ICT has been made available to teachers and stuendts, and obstacles that hinder their use. A questionnaire was developed and sent to 137 teachers who participated in the study. 97 questionnaires were returned, representing 70% of the total population. Results indicated that availability of tools and devices was limited. Educational programs available in resource rooms were Word Processor, PowerPoint, graphic related programs, and educational games. Difficulty in accessing the internet, lack of educational programs for students with special needs, and lack of educational devices were the obstacles encountered by special education teachers. On comparing use of ICT by special education teachers in public and private schools, private schools made significantly greater use. Results showed significant differences among special education teachers based on their educational qualifications. Teachers with Doctorate or Master degrees used ICT more often than teachers holding Bachelor degrees.

Keywords: Using ICT, Teaching, Special Education Teachers, Schools, Resource rooms.

Introduction and Theoretical Background

By the end of the twentieth century, deep structural, technological, and scientific developments were impacting business, education, and the ways we live and learn. Information and Communication Technologies (ICT) introduced computers and networks and dramatically changed communication, education, and access to knowledge. Changes included digitizing of information transmission, storage retrieval, processing, and management and introduction of the Personal Computer (PC), Internet (World-Wide-Web) and a simple user interface (browser).

These developments transformed the whole world into a "small village" (Twalalbeh, 2001). As a result, information technology has become a prerequisite for education, business, and the society as a whole. The "small village" has become a reality in our daily contacts, through media and modern communication tools such as space nets, satellites, and information banks. The widespread use of computers and multimedia fostered these relations. Multimedia and PCs' have user interfaces to combine many digital systems. Digitization solves many difficulties in storing, transferring, and processing information (Zemylas & Vrasidas, 2005).

The importance of information is not a matter of discussion and argument nowadays. The last few years witnessed two parallel revolutions in the field of information technology: the first represents the explosion of information that is easily accessible. The other is electronic communications through which all types of information are transferred securely and at very high speeds at local and international levels. Education has benefited because the technology is simple to use, ubiquitous, and relatively inexpensive. It facilitates rapid production and real-time distribution. It has the ability to rapidly transform and continuously renew the knowledge and

skills on which education is built. Educational information should encompass the untracked developments that includeshuman perceptions and interests (Backard & Rice, 2003). CD-ROMs, communication networks, and others digital electronic technologies became teaching tools quite recently. These tools enable individual learners and teachers to obtain whatever information published worldwide, at any time and place, and at very high speed (Szabo & Hastting, 2000).

UNESCO (2004) defines ICT as those aspects of scientific, technological and engineering knowledge, and administrative methods that are used to access and process information and its applications i.e., the interaction between computers and tools with human beings and their social, economic and cultural matters. Ilomarki (2001) defines ICT as an application of electronic technology such as PCs, satellites, internet, and CD-ROMs to produce, store, retrieve, and deliver digital information in an integrative process with communication nets. Mooij (2004) considers information technology as one part of education technology paying attention to the concept of ICT and employing it in the educational process. This, in turn, requires rethinking of the classroom environment and its components as well as providing opportunities for an ongoing learning process that should be based on cooperative values. In this context, teachers should be provided with the necessary training workshops so that they can acquire suitable competences to deal with their changing roles.

Educators should be aware that ICT is not limited to teaching tools. It serves as a rich resource of information. Using ICT to improve education is not merely a technical issue that concerns itself with hardware and software - it is a group of interactive processes that work in an interdisciplinary social environment enabling interaction amongst peers, teachers, parents and school. This notion employs a wide variety of educational resources to provide individuals with rich learning experiences of consistent modern realities (Mooij, 2004).

Convincing and preparing teachers to integrate ICT into their teaching has become a global mission in the last few decades. These concerns emerged because effective use of ICT in classrooms can significantly improve the overall teaching-learning environment, enrich students' learning experiences, foster participation, increase self-reliance and responsibility , and establish the foundations of long life learning (sustained learning) and personal development of individuals (Galanouli, Murphy, & Gardner, 2004).

Using ICT is not limited to teachers and students. Administrative applications and learning management systems play an increasing role in management of learning. ICT also serves payroll, benefits, and management of human resources; communication between senior administration, teachers, and parents; schedules, evaluation, student records, educational counseling, and library management. The amount of services that ICT can introduce to the academic and administrative operations, particularly in light of the development in PCs' potential, internet and global communication nets, should not be underestimated (Ajlouni, 2005). Research emphasizes the importance of professional development for the successful use of ICT in classrooms. Baylor & Ritchie (2002), for instance, found that the support of professional development and the level of technology literacy of school leadership affected technology acceptance in classrooms and enabled teachers to master these technologies.

ICT affected educational as a major contributor in building nations and as a motivating power for change. Each nations' success, even survival, is tied to their ability to gain high quality learning. We must adopt learning tools that are different from those used in the past that are consistent with modern technologies. Prosperity for present and future generations relies on good knowledge resources (Ajlouni, 2007). In general, learning tools support curricula to educate the next generation of students. ICT offers different methods of instruction and learning environments within which learning processes can grow; teachers who can, through their culture, intellect,

teaching skills, and in-service and pre-service training, facilitate the learning process; and finally, students who are the core of the learning process and the citizens of the future.

Learning is facilitated by information technology and tools such as computers, interactive multimedia, global information networks, powerful search engines, user friendly interfaces, and 24 X 7 access via the internet. These flexible learning opportunities are changing the way educational institutions communicate on-campus and via distance learning. (Ajlouni, 2005).

Educating all students by today's standards and for tomorrow's living most certainly includes the use of technology. Its relationship to providing essential support for students with disabilities in areas of self-care, education, employment, recreation, and community living are readily accepted. Access to technology can provide meaningful learning experiences to develop problem solving and higher order thinking skills and to function in the world beyond the classroom. The appropriate and successful integration of technology into learning environments has the potential to benefit all students.

Examples of how technology use contributes to student academics, independence, employment/careers, and productivity have been discussed as "roles of technology for students with disabilities." Specifically, technology assists students to: (a) maximize independence in academic and employment tasks; (b) participate in classroom discussion; (c) gain access to peers, mentors, and role models; (d) be self-advocate; (e) gain access to the full range of educational options; (f) participate in experiences not otherwise possible; (g) succeed in work-based learning experiences; (h) secure high levels of independent learning; (i) prepare for transitions to college and careers; (j) work side-by-side with peers; (k) master academic tasks that they cannot accomplish otherwise; (l) enter high-tech career fields; and (m) participate in community and recreational activities.

The view of technology as playing a "role" for the student with disabilities includes a focus on the teacher's integration of technology into the learning environment and on technology's impact on student outcomes and related benefits. Teachers are expected to be competent in technology skills and intervention strategies (Burgstahler, 2004).

ICT and Students with Special Needs

Using ICT in respect of those with special needs provides them with many benefits such as reducing or eliminating the negative impacts of their disability, supporting their learning and participation in classrooms, enhancing their professional and creative opportunities in addition to enriching curricula. Moreover, the use of ICT may enhance students' autonomy, self-esteem, self-confidence, and spirit of cooperation, particularly among those with special needs. For instance, using different programs by such students can motivate them to participate effectively in their learning and throughout their life. Further, using supportive technology reduces dependence of students with special needs on others and engages them in their societal activities especially when they find themselves in a position where they can directly get into contact and interact with those around them. Therefore, this category of students becomes more able to control their surrounding environment and to get rid of passive learning habits. This happens with students with special needs because they tend to use their mental and physical abilities that the technology requires (Ajlouni, 2005; Harstell, 2003; and Twalalbeh, 2001).

Students with special needs also tend to avoid written work that leads them to make mistakes in grammar, spelling, and aesthetic handwriting. This causes boredom for them when they have to rewrite what they have already done. Therefore, Word Processing programs enable students to get rid of such problems and may compensate them for their disability through reducing their embarrassments in school or at the work place. Word Processing skills that students acquire may also help them increase their productivity and improve the quality of their works (Snow, 2002).

Deaf students need an understandable language (spoken, sign, or a mixture of both), to communicate with other deaf or normal peers (Hasselbring & Glaser, 2000). Sign language that is enhanced with articulation is used for deaf-deaf and deaf-normal communication. This language is credited in many computer programs that teach the common terms for the deaf and others who deal with them such as family members, teachers, peers and friends. These programs also seek removing barriers among all, so that the community can discover the hobbies, talents and innovations of the deaf. Such programs include the alphabet and the phrases needed for communication with the deaf vise versa regardless of the severity of disability. These ways of facilities protect the deaf from loneliness and isolation inside their community. The *Computed Sign Dictionary* could be the best example of these programs (Burgstahler, 2004).

Individuals with visual impairment also used to live in isolation from others especially when they face language and communication problems especially that their own writing are only read by similar people and vise versa. Blind students rely on Braille language in writing and reading which can only be used by special machine for paper dotting. Therefore, feeling or touching is the main sense by which Braille enables them to learn and teach. However, such language may not per se compensate the blind and enable them to bridge the gap with normal people. That what called for many attempts to be addressed in this regard which depended on questioning: "why *do we step towards the blind and why do we try to understand what they write"?* Consequently, attempts to use modern technology took steps forward. For instance, a mechanism for designing suitable programs to attach Braille machine with PCs were created. Such procedures enable the blind to perceive letters correctly. Other developments in this respect included designing a Word Processor similar to Notepad and designing audio programs. These developments were done so that the visually impaired can extend their communication and interaction with a wider context than the one they live in and to be able to accommodate with modern technologies especially with computers which became the current common language (Hasselbring & Glaser, 2000). This technology allows individuals that are visually impaired the opportunity to have complete control of documents such as opening new and existing files, saving them as they choose and then closing them. The blind can also select font style whether it is bold black or regular with or without underlines as well as using alignments types. All these steps may be done through audio file reminding of correct or non correct reception. Moreover, the blind can review and check his/her written works after finishing the use of short forms of Braille language. Many other orders can be used to facilitate the blind's tasks when using PCs (Ajlouni, 2005).

Using technology or the so-called Assistive Technology may facilitate and meet many needs for normal students and for students with special needs. This can be done with the least efforts and costs. It is well notable nowadays that the positive impacts of technology on those with special needs help them develop their skills that are crucial for communication and adaptation within their communities.

Assistive technology, universal design and universal design for learning shift the focus and consider the goals for learning, the learning materials, the instructional methods, and the learning assessments. Emergent approaches to improve student learning include (a) technology used as a tool to enhance productivity, engagement and performance; (b) technology used for research, organization, collaboration, and expression; (c) technology used to improve access, participation and progress; (d) technology used for discovery and to act upon accessible content to expose patterns and meaning; and (e) technology used to transform flexible content to preferred media. Resultant benefits include improved access, participation and progress in the general education curriculum (Hitchcock & Stahl, 2003).

Assistive technology includes the use of software and hardware as a required consideration for special education students. Determining and evaluating software use and developmental appropriateness for the classroom is daunting, especially in light of the standards-based curricula

states have adopted. Many teacher preparation programs do not include a component software evaluation that can be used with special education students for managing information and determining student needs. To be a technologically competent, special educators and teachers should have the skills to select developmentally appropriate software, to understand and delineate the related benefits of the software, and to align software skills with the curricula. Teachers must understand how software may provide opportunities for the student with disabilities to control environments, to stimulate imagination, to interact with others, and to use open-ended exploration to facilitate development of higher order skills (Weber & Forgan, 2002; Weber & Schoon, 2001).

Considering what we already know about teacher technology use, and in spite of the fact that technology-using teachers are seeing the impact on their students, published studies support what we suspect, that teachers are not using technology (Roblyer, 2004). Yet, the integration of technology and quality teaching are said to be inseparable. Content knowledge and pedagogical knowledge, as indicators of quality teaching, become readily evident within the process of technology integration that includes definition, planning, strategies, student management, and assessment (Pierson, 2001). However, technological knowledge must be modeled and emphasized in teacher education programs in order to ensure its understanding and its appropriate, successful application by the teacher in the K-12 classroom (Martin, 2004; Martin & Crawford, 2004; Martin & Crawford, 2005). Special educators are more likely to use technology competently if it has been embedded in coursework and field experiences (Martin, 2004). Based on indications reflecting a need for better training of teachers, the following issues related to technology use and special education teacher education programs have been identified: (a) university faculty factors such as a lack of modeling of technology in courses; (b) lack of technology implementation in activities and coursework; (c) a lack of expertise to develop complex technology mediated instruction; and (d) lack of technology integration in special education field experiences (Ludlow 2001). Technology integration is a tool that is known to contribute to the educational success of students with and without disabilities (Crawford & Martin, 2001; Roblyer, 2004).

To meet the education needs of students with disabilities and to ensure their access, participation, progress, and assessment within the general education curriculum, teacher technological competence should be viewed as a critical teacher skill for addressing and meeting students' educational needs.

Statement of the Problem and Questions of the Study

Despite the fact that the Ministry of Education in Jordan has been a pioneer in the region in incorporating ICT into all educational stages including resource rooms located within the jurisdictions of the ministry of Education and in funding this national initiation with substantial amounts of its local budget; Several attempts have been made to evaluate the ICT status in the general educational settings however neglecting one important aspect which is the use of ICT in special education settings. Therefore, the problem of this study evolved from the need for evaluating the status quo of using ICT in special education settings represented by resource rooms.

This study aims at examining the extent to which the ICT have been applied on the ground; finding out the devices/ tools used and infrastructure of these resource rooms, the extent of teachers' use of available resources; and obstacles that hinder their use.

More specifically, this study attempts to answer the following questions:

1. What are the most important devices and peripherals used by special education teachers in resource rooms?
2. What are the most educational programs available for special education teachers in resource rooms?
3. What ICT applications used by special education teachers?
4. What are the obstacles that hinder special education teachers from using ICT in teaching students with special needs?
5. Are there statistically significant differences ($P<0.05$) in the mean scores of special education teachers' use of ICT in teaching students with special needs that can be attributed to school type (public vs. private)?
6. Are there statistically significant differences ($P<0.05$) in the mean scores of special education teachers' use of ICT in teaching students with special needs that can be attributed to their educational qualification?

Population and Sample of the Study

The population of this study consist of all (N=137) special education teachers in the public (N= 91) and private (N=46) resource rooms at Amman schools for the school year (2007/2008). The sample of the study consisted of all members of the population of the study (137 teachers). The researchers classified the returned questionnaires which were (117), selecting those suitable for statistical manipulations, and excluding incomplete (20) questionnaires. Therefore, the final number of questionnaires used were (*n*=97), thus, representing (70%) of the total population.

Instrument of the Study

This study aims at exploring the status quo of using ICT in teaching among special education teachers in resource rooms. In order to achieve the purpose of the study, the researchers developed a questionnaire that consisted of two sections:

First section deals with the study purpose, objectives and a general outlook regarding its major parts. It also includes the demographic data and information such as educational qualification, gender of resource room teachers, and school type (public/ private) for research purposes.

Second section includes four major parts: the first part comprises of tools and peripherals of computers, the second part includes the type of programs available for teaching, the third part consists of already used applications, and the fourth part covers the obstacles that hinder special education teachers' use of ICT in teaching.

Instrument Developing Procedures

To develop the instrument of the study, the following steps were taken:

1. Review related literature, particularly articles related to ICT used in instruction. The researchers found theoretical background and questionnaires (Ajlouni, 2007; Ajlouni, 2005 ; Pelgrum, and Anderson, 2002; Pilgrim, 2001)
2. Parts (items) of the questionnaire were developed based on relevant literature, personal expertise of researchers in the field, and pre-investigations of applications used / available at resource rooms.
3. The initial version of the instrument was examined by a panel of ten experts. The final version of the instrument consisted of four parts: 1) tools and peripherals comprised of (13) items, 2) available programs at schools (22) items, 3) ICT used applications in

teaching process (34) items; and 4) obstacles encountered by special education teachers regarding the use of ICT (21) items.

Validity and Reliability of the Research Instrument:

Although the study instrument was constructed based on an extensive review of related litreture, the researchers consulted a group of (10) experts at the University of Jordan to obtain face validity. The experts were asked to evaluate the instrument in terms of clarity of items, linguistic accuracy and appropriateness of the instrument to achieve the purpose of the study. Revisions and suggestions made by the panel of experts were taken into account, and a final version of the instrument was achieved. Reliability coefficient was calculated using test-retest technique. A group of (20) male and female special education teachers were randomly selected to respond to the instrument with a two-week interval between the first and the second response. A value of (0.93) using Pearson correlation coefficient was obtained which was considered satisfactory for the purpose of the study.

Data Collection

After developing the final version of the instrument and ensuring its validity and reliability, the researchers executed the following procedures:

- Identifying the population of the study which consisted of (137 special education teachers) teaching in public and private schools in Amman.
- Making visits to all schools containing resource rooms and manually distributing the questionnaires to the participants.
- Collecting the questionnaires one week after distribution.
- Classifying the returned questionnaires which were (117), selecting those suitable for statistical analysis, and excluding incomplete (20) questionnaires.
- Using SPSS program to conduct the statistical analyses of the data in order to answer the questions of the study and obtain the results.

Statistical Analysis

The following statistical methods were used:

- Frequencies and ratio importance of the sample distribution on the independent variables were computed.
- Frequencies, mean scores and standard deviations and ratio importance for all items in respect to each aspect of the study were computed (ratio importance above 75% was considered high, 50%-69% medium, below 50% was considered low or limited).
- T-test and analysis of variance (ANOVA) were conducted to find out the differences in the mean scores of using ICT applications by resource room teachers according to school type (public, private) and according to the educational qualification level of special education teachers.

Results and Discussion

First - Results related to the first question

"What are the most important devices and peripherals used by special education teachers in resource rooms?" To answer this question, the researchers computed the frequencies and percentages for the availability of tools and peripherals available in resource rooms. Table 1 show these frequencies and percentages.

Table 1
Frequencies and Percentages of Tools and Peripherals Available for use in Resource Rooms ordered decently According to Percentages

#	Type	Frequency	Percent
1-	At least one computer in resource room.	41	42.1
2-	Loud speakers	40	41.5
3-	Ordinary printers	39	39.2
4-	CD – Rom (Multimedia)	36	37.1
5-	Microphone	35	36.1
6-	(CD-R, DVD) CD writer	19	19.5
7-	Data show	17	17.5
8-	Devices for digital photos and videos	16	16.5
9-	Colored printers	11	11.3
10-	Scanner	6	6.5
11-	Drawing palette	6	6.2
12-	Terminal devices and Tools for disabled students (mentally, sensory & physically)	4	4.1
13-	Laser printers	2	2.1

Table 1 indicated that the availability of tools and peripherals in resource rooms were limited. Participants of the study indicated that the percentage of availability of tools and devices was minimal. It is found that (42.1%) of the resource rooms have computers, (41.5%) have loud speakers, (39.2%) have ordinary printers. These percentages are considered minimal to a certain extent. As for the availability of the rest of the equipments and peripherals in resource rooms, terminal devices and tools were the least available particularly those allotted for students with disabilities (mentally, sensory and physically) with only (2.1%).

Second- Results related to the second question:

"What are the most educational programs available for special education teachers in resource rooms?"

To answer this question, the researchers computed frequencies and percentages of the available types of educational programs in resource rooms that are used in teaching. Table 2 indicates these figures.

Table 2 indicated that most educational programs available at resource rooms were Word Processor, PowerPoint, drawing related programs, and educational games programs with percentages of (54.6%, 53.6%, 49.5%, 41.2%) respectively. These figures indicate that special education teachers use educational programs moderately. The researchers attribute this result to the availability of these programs that were already installed in computers purchased by the Ministry of Education and private schools. The availability of the rest of educational programs was minimal with percentages ranging between (6.2% -39.2%). This result were not surprising and consistent with Ajlouni (2005), Ilomarki (2001), Mooij (2004), and Diane (2000) who found that these programs were not included in purchasing contracts of computers since they were not important for

teaching; however, buying such programs was left for school administration whenever the resource room teachers or computer trainers needed them.

Table 2
Frequencies and Percentages of the Available Types of Educational Programs in Resource Rooms that are used in Teaching.

#	Type of programs	Frequency	Percentage %
1-	Word processor	53	54.6
2-	PowerPoint	52	53.6
3-	Programs related to drawing	48	49.5
4-	Educational games programs	40	41.2
5-	Excel Program	38	39.2
6-	Games and entertainment based programs	38	39.2
7-	Audio and video programs	32	33.0
8-	Databases	32	32.5
9-	Tracking students work programs (Management Instruction programs)	29	29.9
10-	Internet browsers	25	25.8
11-	Self-learning programs	23	23.7
12-	Visual and audio Communication and interaction programs	17	17.5
13-	Drill and Practice programs	16	16.5
14-	Simulation programs	16	16.5
15-	Statistical programs	12	12.4
16-	Individual teaching plans programs	12	12.0
17-	Electronic mail	11	11.3
18-	Electronic encyclopedias	9	9.3
19-	Music authoring programs	7	7.5
20-	Programming languages	6	6.2
21-	Administration programs (Testing and tracking students progress)	6	6.2

Another factor that may interpret the lack of these programs in resource rooms could be attributed to teachers' perceptions and priorities of the important programs used in teaching. Thus, teachers did not see these programs as an important component in teaching students with special needs, therefore, affecting their demand to purchase such programs.

Third - Results related to the third question:

"What ICT applications used by special education teachers?"

To answer this question, the researchers computed the mean scores, standard deviations, and ratio importance for the extent to which special education teachers of resource rooms use ICT. Table 3 shows these figures.

Table 3
Mean Scores, Standard Deviations and Ratio Importance for the Extent to which Special Education Teachers Use ICT

#	Item	Mean Score	Standard Deviation	Ratio %
The use of ICT in resource rooms				
1-	I carefully provide good educational programs from different resources.	2.86	1.29	57.18
2-	I use computers in preparing and planning for exams.	2.85	1.38	56.94
3-	I use computers in preparing lessons and doing routine jobs.	2.78	1.24	55.56
4-	I allocate time for pre-preparation of my lessons using computers.	2.75	1.22	54.93
5-	I use the educational game programs with students with special needs (i.e., those programs that aim at creating educational climate where academic achievement and entertainment are combined to generate an exciting educational atmosphere).	2.62	1.37	52.33
6-	I use drill and practice educational programs associated with various skills such as (solving math problems, vocabulary and spelling…etc)	2.60	1.35	52.05
7-	I use computers and internet resources to retrieve educational materials and articles related education students with special needs	2.58	1.29	51.67
8-	I accompany Students with special needs to the computer lab so that they can learn with the support of computers.	2.56	1.45	51.11
9-	I carefully provide and prepare all needed materials associated with the computer lab (i.e. providing paper for printing and CDs for storing purposes)	2.30	1.34	46.03
10-	I use interactive CDs in to assist students with their self-learning	2.29	1.27	45.75
11-	I use multimedia programs (video, audio, & animation) in some lessons.	2.22	1.35	44.44
12-	I use computers to analyze test results of students' to track their progress and achievement of educational objectives.	2.00	1.17	40.00
13-	I use the e-mail for educational purposes.	1.96	1.15	39.17
14-	I help students with special needs to use chatting programs to encourage dialogue between students and others.	1.86	1.05	37.26
15-	I use computers with students with special needs to solve math problems.	1.85	0.73	36.99
16-	I use computers in teaching various subjects in the resource room.	1.83	0.66	36.53
17-	I use self-learning programs with students with special needs where computer take the role of the teacher in explaining information, recording learners' responses and evaluating his/her learning outcomes.	1.78	1.02	35.56
18-	I use data show to display the educational material.	1.74	1.04	34.72
19-	I request students with special needs to use computers in various educational tasks.	1.62	0.81	32.33
20-	I use internet resources and related sites as means for supporting classroom presentations of certain topics to explain lessons for students with special needs.	1.46	0.73	29.30
21-	I attend my class early to ensure successful access to internet.	1.46	0.60	29.12
22-	I ask students with special needs to write reports based on using information from internet.	1.40	0.83	28.06

23-	I use group discussion techniques (forums) to conduct educational dialogues related to study materials.	1.11	0.35	22.16
	I use the following computer application programs:			
24-	Windows	3.17	1.46	63.33
25-	Word processor	3.01	1.54	60.28
26-	Excel	2.29	1.28	45.88
27-	PowerPoint	1.88	1.10	37.61
28-	Access	1.36	.483	27.20
	I use internet in the resource room for the following purposes:			
29-	I use e-library in teaching students with special needs.	2.75	1.22	54.93
30-	Getting educational programs.	2.10	1.39	42.00
31-	Visiting sites for information research.	1.94	1.33	38.86
32-	Reading papers and magazines.	1.46	0.60	29.12
33-	Communicating through e-mail with students with special needs.	1.36	0.48	27.20
34-	Teaching students with special needs.	1.32	0.57	26.40

Table 3 shows that the first eight items had ratio percentages above 50 percent (means above 2.5), this indicates that special education teachers used moderately ICT to pre-prepare and prepare for lessons and instruction, exams, using educational programs and games.

The remaining items of this part had low percentages ranging from 22.9% to 46.03% which reveals low percentage of using ICT by special education teachers. The lowest item that comes in order is*" I use group discussion techniques (forums) to conduct educational dialogues related to study materials."* The low use of group discussion techniques can be justified; the researchers believe that such applications are viewed as recent technologies that need time to be actively used in the teaching setting. Moreover, such applications may also require special education teachers to master design skills, post electronic interactions, ability to publish on web, and provide sufficient time for preparing these discussions, these skills are not usually mastered by special education teachers.

As for teachers' use of computer programs and applications in resource rooms, results in Table 3 indicate Windows operating system is mostly used with (63.33%) followed by Word processor and Excel, with percentages of (60.28%, 45.88% respectively), whereas PowerPoint and Access had the lowest percentages with (37.61 and 27.20 respectively). The ratio percentage for using MS-Office is almost consistent with many previous research such as Edwina, 2003; Ilomarki, 2001 and Nino, 2003.

This consistency reveals that MS-Office programs (Word processor, PowerPoint, Excel, and Access) are available to the participants of this study to a great extent. This also indicates that participants use these programs because of their easy accessibility and familiarity; moreover, they do not require advanced levels of mastering skills.

Researchers attribute teachers' mastery of these programs and applications to the continuing training provided by the Ministry of Education such as ICDL and INTEL training courses.

Uses of internet were considered minimal regardless of its purpose. According to ratio percentages available in table 3, all items had low ratio percentages (less than 50%) with the exception of item 29 related to the use of e-library in teaching students with special needs.

The researchers attribute these findings to the limited access to internet at resource rooms, in addition, to the huge work load required by special education teachers which make it almost impossible for them to allocate time to use the internet. In general, results indicated that uses of ICT were considered minimum among special education teachers which was consistent with the findings of Ajlouni (2005) and Mooij (2004).

Fourth- Results Related to the fourth Question

"What are the obstacles that hinder special education teachers from using ICT in teaching students with special needs?"

To answer this question, the mean scores, standard deviations and ratio importance of obstacles that hinder the special education teachers from using ICT in teaching students with special needs was computed. Table 4 shows these figures.

Table 4

Mean Scores, Standard Deviations and Ratio Importance of Obstacles that Hinder Special Education Teachers from Using ICT to Teach Students with Special Needs

No.	Difficulties	Mean score	Standard deviation	Ratio %
1	Lack of Internet access.	3.39	0.69	84.9
2	Lack of educational programs for students with special needs.	3.37	0.75	84.2
3	Lack of educational devices.	3.32	0.68	82.9
4	Insufficient terminal units and peripherals (printer, scanner, etc.)	3.27	0.93	81.8
5	Lack of information about the existence of suitable devices and programs for teaching.	3.21	0.91	80.1
6	Lack of sufficient reinforcement for using ICT	3.20	0.92	80.1
7	Unavailability of suitable training workshops for computer use.	3.19	0.87	79.7
8	The quality of training workshops offered to special education teachers are insufficient	3.08	0.79	77.0
9	Lack of administrative support.	3.05	0.88	76.4
10	Lack of technical support (maintenance).	3.06	0.85	76.4
11	Inappropriateness of physical environment for using ICT.	2.99	0.91	74.7
12	Enormous workload of special education teachers	2.92	0.83	72.9
13	Lack of allotted time for the use of ICT	2.89	0.84	72.3
14	The unavailability of up-to-date technology.	2.79	0.97	69.9
15	Weakness communication and electrical power infrastructure.	2.77	1.01	69.3
16	High teacher- student ratio in resource rooms	2.70	1.01	67.6
17	Lack of students' motivation to learn through technology.	2.69	1.03	67.4
18	Lack of computer labs.	2.69	0.91	67.2
19	Lack of updated versions of programs used	2.59	0.97	64.9
20	Lack of previous experience in using computers.	2.54	1.05	63.5
21	Fear from using modern technological applications in teaching.	2.26	1.01	56.4

Table 4 describes obstacles that encountered special education teachers from using ICT in teaching students with special needs; half of the items presented in table 4 had high ratio percentages indicating major obstacles in using ICT among special education teachers. The other half of the items was rated as moderate obstacles by the participants of the study. Although similar results were obtained from prior research regarding regular education teachers in Jordan (Ajlouni 2005 and Ajlouni 2007) it is obvious that special education teachers encounter even more obstacles in using ICT, this can be explained by the level of interest by the ministry of education in general education versus special education. It seems that the priority of the ministry of education in terms of providing and fostering the use of ICT is focused towards the general population of schools, which implied that administrative personnel believe that regular students can use and benefit more from ICT than students with special needs.

Unfortunately, we can assume that attitudes toward special education are still viewed as of lower status in Jordan than the general education. Therefore, funding, training and facilitations are mostly provided for general education teachers.

Fifth- Results related to the fifth question:

"Are there statistically significant differences (P<0.05) in the mean scores of special education teachers' use of ICT in teaching students with special needs that can be attributed to school type (public vs. private)?"

To answer this question, T-test was used to compute the differences among school teachers (public and private) on the total degree of using ICT. Table 5 shows these results.

Table 5

T-Test Results of the Degree of Using ICT by Special Education Teachers According to School Variable (Public or Private)

School	Mean score	Standard deviation	t-test value	Significance level
Public	2.014	0.77	2.231	0.02*
Private	2.365	0.73		

**P<0.05 statistically significant*

Table 5 indicates that there are significant differences at (P<0.05) due to the school variable (public or private) where the t-test value is found to be (2.231). This indicates that the degree of using ICT among special education teachers in private schools (μ=2.365) exceeds the degree of using ICT among special education teachers in public schools (μ=2.014). The researchers believe that private schools provide better computer devices for their teachers compared to public schools which, in turn, reflects on teachers' performance and, consequently, contributes to these differences between both groups (public and private) regarding the use of ICT.

Furthermore, we believe that schools in the private sector are highly competitive in Jordan; accordingly, school administrations strive to provide best practices in education including the use of ICT in their programs.

Sixth- Results related to the sixth question: "Are there statistically significant differences (P<0.05) in the mean scores of special education teachers' use of ICT in teaching students with special needs that can be attributed to their educational qualification?"

To answer this question, mean scores for each educational qualification level of special education teachers (Doctorate or Master 2.734, Bachelor 1.958, Diploma 1.565) were computed, these mean scores indicate that there were surface differences between the educational qualification levels of special education teachers. In order to find out if these differences were significant, One Way

Analysis of Variance (ANOVA) was computed between the educational qualification levels of special education teachers (Doctorate or Master N = 17, Bachelor N= 36, Diploma N= 22) on the total degree of their use of ICT. Table 6 shows the results of ANOVA related to this question.

Table 6

Results of One Way ANOVA Related to the Participants use of ICT According to the Educational Qualification Level of Special Education Teachers.

Source of Variance	Sum of Squares	*df*	Mean of Sum of Squares	F-value	Sig.
Between groups	13.337	2	6.669	15.662	0.000*
Within groups	30.655	72	0.426		
Total	43.992	74			

**P<0.05 statistically significant*

One way analysis of Variance (ANOVA) was computed between the educational qualification levels of special education teachers (Doctorate or Master N = 17, Bachelor N= 36, Diploma N= 22) on the total degree of their use of ICT. Results reveled that there were significant statistical differences at (P<0.05) that can be attributed to the educational qualification levels of special education teachers (F=15.662).

To find out the sources of these differences, Tukey test for post comparisons was computed. Results indicate that these differences are between the first level (Doctorate or Master μ=2.734) and the second level (Bachelor μ=1.958) in favor of the first one, whereas there were no differences between the second level (Bachelor μ=1.958) and the third level (Diploma μ=1.565).

These results are considered logical because teachers who hold higher educational qualifications have more ICT based courses within their graduate program. Thus, it is expected that teachers with higher qualifications use ICT resources (i.e. searching for articles and resources, the use of internet, typing, statistical analysis, PowerPoint presentations...etc) in their course of study more often than those with lower qualifications.

Conclusion

Results of this article indicated various limitations in terms of the availability of ICT tools and programs, limited usage of ICT among special education teachers, and great obstacles that holds back special education teachers from using ICT in teaching students with special needs. In light of these findings, we strongly recommend that the Ministry of Education in Jordan should provide suitable technological infrastructure to enhance the use of ICT among special education teachers, and provide them with the necessary training to assure better quality of instruction. We also encourage further research to examine the efficiency of incorporating ICT in special education to demonstrate possible academic or social gains among students with special needs.

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Editor's Note: Learning occurs through all senses. Instructional technology offers a broad spectrum of learning opportunities using text, audio, visual, motion, interactive multi-media, and networks. These tools maximize the learning opportunities of students with special needs.

Does Availability of Audio Podcasts Enhance the Classroom Experience for First Year Dental Students?

Data on use and perceived benefits.

Elizabeth R. Whitney and Monica A. Pessina

Abstract

Lectures in Anatomical Sciences-I, a didactic course covering topics in histology and neuro-anatomy, were audio recorded and made available to students in the fall of 2006 at Boston University's Goldman School of Dental Medicine. To assess audio recording usage and contributions to the learning process, a questionnaire was developed in collaboration the Office of Educational Research, also at the Goldman School of Dental Medicine. The questionnaire was administered to students with the standard course evaluation at the completion of the course. There was a 78% response rate to the survey (90/115). Of the students responding, 56% reported using the lecture recordings. Data revealed that 56.8% of the students who used the recordings listened to the lectures within one week and that the majority of students listened to lectures in their entirety. When asked to the respond to the statement "my learning was enhanced by the use of the lecture recordings," 93% of users chose either "agree" or "strongly agree." Additionally, students indicated that the lecture recordings offered the opportunity to actively engage and participate during class. This technology-based resource may increase active learning for all student users and provide an important supplement for dedicated students committed to learning course content.

Key words: podcast, audio recordings, anatomy, education, instruction technology, medical education, dental education.

Introduction

The curriculum for first year dental students is intensive, with over 20 hours of weekly lecture-based instruction and additional extended laboratory sessions. In class, students typically focus their attention on lecture content while taking notes and synthesizing the presented material. The volume of material can be overwhelming and students may leave lecture with concerns regarding the accuracy of their note taking and understanding of key concepts. This was the case during the fall of 2006 when class officers representing the first year dental students (DMD-1), at Boston University's Goldman School of Dental Medicine, requested that all lectures in Anatomical Sciences-I be audio recorded. Anatomical Sciences- I is a didactic course that covers the topics of histology and neuroanatomy.

At the time of the request, the students felt strongly that the opportunity to review an audio recording of lectures would enhance their proficiency with course content. The Office of Information Technology (IT) at Boston University's Goldman School of Dental Medicine supported the students' request; members of this Department provided the technical resources for this pilot project. Prior to the formal implementation of this pilot program, several students, with the permission of faculty, were recording lectures for use as a personal accessory learning tool. The introduction of the audio recordings on the password protected, school managed website allowed students without this technology to access lecture recordings. Given the potential educational benefits of this program, the Course Directors felt that a formal assessment of audio recording usage and contributions to the learning process was indicated.

Materials and Methods

At the Goldman School of Dental Medicine, laptop computers are distributed to all DMD-1 students during orientation and students are oriented to the Blackboard CourseInfo™ website, which is used to distribute teaching materials. Students can easily navigate the password protected Blackboard CourseInfo™ website and are generally comfortable downloading course materials. PowerPoint® files of Anatomical Sciences lectures are routinely made available in CourseInfo™ folders. At student request, audio recordings of corresponding lectures were added to the Blackboard CourseInfo™ website in separate folders. Only registered students were granted access. The addition of audio recordings posed no technical issues or concerns. The audio recordings were obtained using Audacity® software and were posted as downloadable MP3 files.

To assess the use of lecture recordings, a questionnaire was developed in collaboration the Office of Educational Research at Boston University's Goldman School of Dental Medicine. The questionnaire was administered to DMD-1 students with the standard Anatomical Sciences-I course evaluation at the completion of the course. The questionnaire included both open-ended questions that allowed students to describe their experiences with the audio recordings as well as closed-ended questions in which students selected from a dichotomous scale (yes/no) or ordinal scale (1-5).

Results

There was a 78% response rate to the survey (90/115). Of the students responding, 56% reported using the lecture recordings. Although the audio recordings can be easily downloaded onto a portable device, a computer was the primary tool used to listen to the lecture recordings (laptop: 84 %; PC 12%). Few students (4%) reported using a mobile device, such as an iPOD.

The data revealed that 58% of students using the recordings listened to the lecture within one week, with 14% listening 1-2 days after the lecture, 26% listening 3-4 days after the lecture and 18% listening 5-7 days after the lecture (Fig. 1). Thirty-four percent of students listened just prior to the examination (Fig. 1).

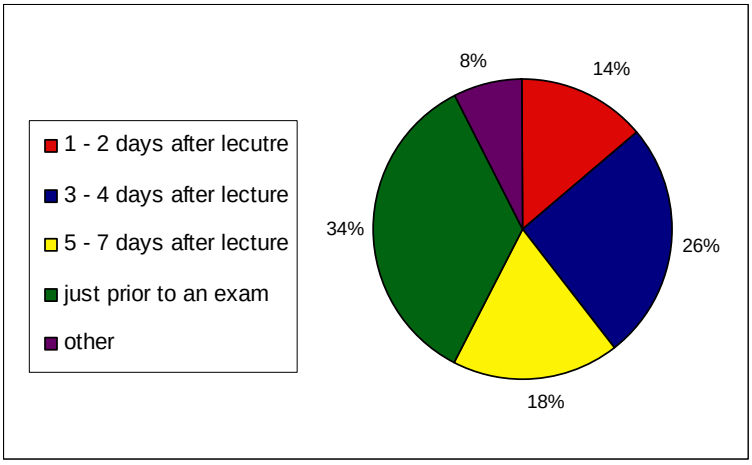

Figure 1: When did students use the lecture recordings?

Most students listened to lectures in their entirety; 30% listened to all lectures in their entirety and 46% listened to selected lectures in their entirety (Fig. 2).

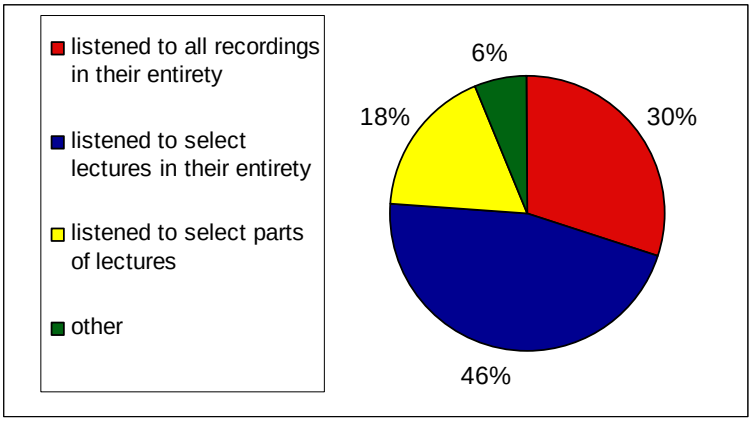

Figure 2: How did students use the lecture recordings?

When asked if the availability of the audio recordings changed in-class note taking strategies, many students indicated that this resource provided the opportunity to focus on "listening to" and "understanding" course content rather than "worrying about writing down details." In addition, most students responded that they "strongly agree" that their learning in the course was enhanced by the use of lecture recordings (Fig. 3). Specifically, when asked to the respond to the statement "my learning was enhanced by the use of the lecture recordings," 93% of users chose either "agree" or "strongly agree." Several students expanded on this response, indicating that the lecture recordings offered and opportunity better understand the "big picture."

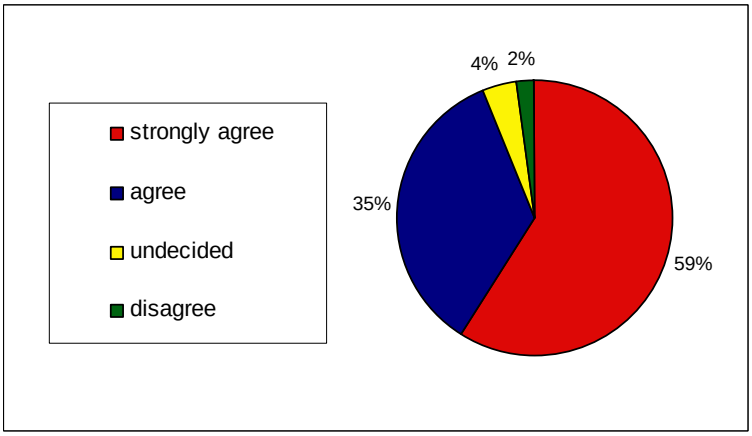

Figure 3: Did lecture recordings enhance learning?

Finally, of the 42% of the students who reported that they did not use the recordings, the most common reason reported was "lack of time."

Discussion

Technology is moving into the educational setting.[1, 2] Courses with a web-based component are part of the educational experience for many students.[3, 4] In fact, the technology of podcasting lectures was pioneered at the University of Michigan Dental School in 2004.[5] The term "podcasting" stems from the words iPod and broadcasting.[5] Podcast technology allows the posting of downloadable audio files. This is in contrast to individuals making audiocassette recording for personal use or a University sponsored audiocassette recording that requires

students to listen in a library or check out a cassette for a few days. Since the initial introduction of podcasting, its usage and effectiveness has not been extensively explored in the literature, but it poses an interesting array of questions regarding student learning or perception of learning.

At the Goldman School of Dental Medicine, both local and international students are represented in the DMD-I class; these students come with diverse cultural and academic backgrounds that may shape students' learning needs. In addition, a variety of learning styles have been described and studied, with research demonstrating that the medium through which course content is disseminated may impact learning.[6, 7, 8] The addition of new technologies, such as easy access to lecture audio recordings, provides students with an additional educational resource to supplement traditional didactic lectures.

In addition to providing a mechanism for review of lecture content outside the classroom, the availability of lecture recordings may also enhance the in-class experience. Of the students who listen to the audio recordings, 93% believe that their learning was enhanced by the use of this resource. Although the anonymous nature of the process did not allow us to compare exam scores between users and non-users, the users indicated that, irrespective of examination scores, they felt that they gained a greater appreciation and understanding of the "big picture." As educators of adult learners, our role is to facilitate an active learning environment.[9] By providing a resource for students to review lectures for specific details, their attention in-class can be focused on participation in the lecture and discussion. Cognitive researchers suggest that engagement in the active learning process enhances learning and improves recall.[10]

In summary, this technology-based resource may increase active learning for all student users and provide an important supplement for the struggling, yet dedicated student. In fact, the greatest benefit may be to students who have difficulty understanding course content within the confines of a time-limited lecture period. As educators, it is important to consider diverse student needs in the context of a demanding curriculum and provide alternative resources and a supportive academic environment to facilitate individual success.

ACKNOWLEDGEMENTS

The authors thank the Office of Information Technology for supporting this project and Dr. Deborah Fournier, Ph.D. in the Office of Educational Research and Evaluation for assisting with survey development and administration.

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Editor's Note: This presentation is provocative, evocative and disturbing. It needs careful analysis of the research and outcomes from an academic-professional perspective. This paper is analogous to having a well respected shoemaker being taught quite successfully how to craft shoes by someone who is barefoot!

Blended Learning: The Key to Success in a Training Company

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Spain

Abstract

Master-D is a training company that was founded in 1994. It was initially comprised of 10 people. Now has more than a thousand employees and has branches in five different countries across three continents. This company owes a great deal of its success to the concept of blended learning, or its unique manner of understanding this educational form which we like to call *open training*.

In the following pages we will examine some of the principles of a successful business based on this training model.

Keywords: Blended learning, open training, e-learning, distance learning

Introduction

First of all, it should be made clear that businesses are exactly that, business. Companies and their *know how* is not about reflecting on concepts, models, theories, or other reflections surrounding the paradigms which support one way or another way of proceeding. Companies, Master-D, at least, wants to be practical and for this reason it follows the Spanish refrain *The cobbler for his shoes* (*Stick to what you know* or *Leave it to the experts*).

With this in mind, we are not going to discuss whether the terms *blended learning* (Bartolomé, 2004) or *flexible learning* (Salinas, 1999) or *semipresent teaching* (Bartolomé, 2001; Leao y Bartolomé 2003) or *mixed training* (Pascual 2003) or any other such terms are appropriate. Master-D has decided on the term *Open training*.

In fact we are with Coathen (2003) and Marsh (2003) when they define blended learning as a way of learning which combines presential teaching and non presential technology,

We hold that the essential idea is the one which considers the key to success to be any combination of the available methods which facilitate learning and resolve the specific problems of each learner (or in business; client).

Some Ideas to get Started

For some reason there are issues of mistrust between educational institutions and training companies. This mistrust mainly comes form the educational institutes but let us forget that for a moment.

In certain sectors of the educational community, to suggest that education can be good business is clearly a provocation.

It is obvious that people who think in that way have little idea about business. By this stage, these Manichean concepts should have been banished for life (Puech 2006). In business it is not obligatory that someone wins and someone loses. It is quite possible that both parties win and this

is the true vision of a company in education. Isn't it true that editorials and schools take full advantage of their text books?

Whoever has tried to make a fortune in education has failed miserably. In Spain there were the notorious cases of *Opening* and *Aidea* in 2002. For this reason, the reputation given, at least in some cases, is unfair. The opinion of some academics is to link business - also those ones which are involved in training courses - with a kind of cut throat neo-capitalism whose only concern is profit and for this reason the final quality of the product is unsatisfactory.

This suggestion is just as fair as giving credit to the notion that universities are riddled with nepotism, there are some well renowned university professors who ascertain that this situation does exist and they worry that there are public institutions which are more interested in image and public opinion or their own interests rather than teaching or in education as a whole.

Equally, it would be unfair to dismiss the idea that some of the problems which afflict our educational institutions could be resolved using solid business sense. Let's not be tempted to involve human resources. However, without a doubt, it would do them a world of good to have to declare their successes, or have freedom of management or explain skilful budgets (as long as these are accompanied by impressive results) which, generally speaking, the private sector demands and which the public sector lacks.

However this is not the case.

On the other hand, we might agree that the introduction of technology in the educational field may allow certain financial cut backs in the teaching staff as some authors have predicted (Marsh 2003) but we also believe that there are clear gains such as investment capital, product creation, housing, broadband, servers, etc . . .

Introduction of this technology in training companies requires a huge effort on the part of its staff to learn, to evaluate, and to be constantly up to date with the teaching possibilities, and the other possibilities either motivational or for the production of materials and contents. This investment obviously takes up an important part of a companys' costs. Pincas (2003) discusses a soft option to introduce TIC into teaching bodies. Companies do not even consider this, if a professional from the company needs training or needs to be brought up to date, the company itself provides this, however it expects favourable results from this training, it is not up for discussion, it forms part of the essence of business; investments should be followed by returns whatever the subject.

It is an absolute fallacy to say that training companies, the real ones, (not those that only look to make easy money), choose *e-learning* or *blended learning* because it brings more profits with less costs. No.

Businesses, unlike some education centres, cannot have captive clients. Businesses have to accommodate the needs of their clients, they have to give a service and a product which satisfies their clients. Training companies cannot do anything but perceive their business as an opportunity to 'win – win'. Otherwise they are doomed to failure.

Blended Learning: A Solution

Nobody can disagree today that in this society important changes are taking place.

Ideologically, technologies, communication systems, scientific discoveries are bringing about a change in our way of perceiving the world and our reality. Economically speaking, society is leaning towards the service sector and pays more attention to images and information than to products.

As for organization, teamwork is highly valued where the capacity to adapt and continuous learning are fundamental. As for personnel the precariousness of the job market can lead to conflicts in working relationships. (Garrido y Valverde,1999)

Today's worker finds himself in a world which is changing at an incredible speed. In fact, the changes are occurring so fast that, what was learned in childhood a generation ago is of little use a few years later as an adult. The rhythm of change in society is so fast that the basic training given is not sufficient to respond to all the present and future necessities in society.

For years now people have believed that training should be life long and that continuous training is a key element in a developed modern society. The important changes that technology is introducing into the workplace have made this principle more evident than ever.

Bell (1979) established that knowledge was the strategic principal resource in post-industrial society. Previously, Drucker (1993) appears to have been the first to acknowledge that humanity is entering into a society of knowledge.

However to create that society of knowledge we must try to improve society's capacity for learning. In order to do this, we must improve the facilities for learning, so that people learn to learn. We already talk about a learning society, supported by information and technology, where the paradigm of teaching becomes learning. (Adell 1997).

Aiello (2004) quoting Castells (2002) proves that the real change in our society consists of a new form of collating knowledge and production through what we call a network society. In this way, (Castells2002) society evolves in an organized way using as a starting point the capitalism which Max Webber (1993) proposed, and relates to the business framework and to the experience which we are discussing. We will come back to this point.

However we are now with Bartolomé (2004) where he considers learning to be an individual activity of the pupil, and that teachers can not do anymore than guide, accompany and facilitate…whatever we agree, yet learning is the responsibility of the learner and as such he must do it.

So given that learning is something that the learner does whenever he wishes or whenever he can, we as training companies have had to look for formulae to offer this accompanying service, tutoring services or orientation in the most flexible way possible; in business we are certain that we have to go or be exactly where the client may need you.

In this way, the time and space (the moment and the place) where learning can take place is flexible since each person's individual circumstances are his or her own.

Within this framework and from this perspective, *blended learning* or our particular adaptation of this model within our also very particular version of *open training* has been one of the reasons for our success. Our belief in this model supports a decision which is perfectly aligned with the vision and the strategy of this company and this has allowed its growth, its consolidation and the high level of satisfaction which our clients enjoy, some 25,000 new students in the last five years.

What Differentiates *us* from the Rest

As we have already stated above, any business is reliant on its clients and these clients want answers, not judicious debates on what constitutes the paradigm, the model or the theory upon which a certain way of behaving depends.

The way a business works does not have to conform to any learning principles which can be discerned by the use of new technologies, (Kemp and Smellie 1989) or invest effort and resources

to develop and decipher the theories behind some of the techniques and technologies most frequently used in teaching and learning (Tomei 2003).

Master-D, as a company which offers open training has never considered if the exercises and practice proposed in these teaching tools originate from a particular theory, or whether the way the information is presented is more or less compatible with certain cognitive theories or indeed if the collaborative work which it proposes is more or less humanist. These questions, as we stated above, are for others to ask.

In this sense, companies have an inherently eclectic ethos, any theorist will recognise today that in real terms, all theories work in parts and all have certain limitations; in the end the client needs a service i.e. a solution to his problem, he wants answers tailored to his particular problem and situation.

Therefore, the first difference is that the work done in training companies can never find a place in academic institutions dedicated to discussion and theoretical reflection, and often, for this very reason, its work and results get no recognition apart from the concrete results of each case.

The business world by definition must be grounded in practicality.

First of all there is a noticeable difference between those teachers who work in business and those who work outside the business world. A teacher working in a company such as this one reflects on his work each time a pupil of his/hers sits an exam. This happens to such an extent that part of his salary depends on the results of his pupils. Anyone who drops out of the course or fails a course is also a failure for the teacher since this affects the teacher's salary.

In other educational contexts the teacher is both examiner and examinee. Here he/she is clearly the *examinee*.

From this example we could obviously derive many consequences and differences which would largely discredit the opinion –a widespread one– that in these models of mixed teaching, the saturation or lack of preparation of the tutors means that many students abandon the courses and therefore the results are quite poor.

Obviously, there are students who give up but they do so because learning is an individual matter for the learner, and whether we like it or not the onus of learning falls on the learner. In our point of view there are opinions which are more demagogic than realistic which blame failures on inadequate design of the I.T. tools or on a lack of follow-up or little motivation on the part of the teacher or on the channel through which the information is provided etc. Without denying that these problems exist, neither can we deny that it is much easier to see other people's faults than our own and therefore, blame others for our own failings.

Defending and declaring this idea that learning is an individual's decision and one which requires a personal effort (even among our clients) is one of the reasons for our company's success. Can you imagine a public sector worker being obliged to pay for a training course after matriculating because he is not taking full advantage of it?

In this company, Master-D, it happens. If someone needs some specific training we provide it, and the company pays the costs. If the employee is seen to be neglecting this opportunity then he is obliged to pay the costs himself.

This norm taken to an extreme, as it is in this case, commits to refund the money invested by the client if his objective is not reached provided that he himself has kept his side of the deal.

Training, Market and Trade

A certain Puritanism (or even hypocrisy) often prevents us from uttering the words training and education together with 'dirty money' business, market, money, client…

Let's not create a polemic, no matter how many have done business by negotiating with social matters, disguised as charity work and supposedly free. (Fandos,2004)

At this point we should be aware that nothing is free, everything comes at a price, but a different matter altogether is who pays that price. It may be that one does not have to 'pay' for something (nothing at all or a perhaps a small part) but that 'something' almost always comes at a cost to someone.

From this perspective, and put simply, what's wrong with considering the student or the pupil (also the teachers and other staff) for what they really are; clients (both internal and external)?

Let us go back to a previous point, real businesses and certainly ones which deal with training, are not the ones which are looking to make their fortune, or easy money. No. Real businesses are built on the win-win principle. Both sides (company and client / client and company) win. We work together to achieve our goal. Real companies go to such great lengths to realise this vision that it is essential that their objectives are closely linked to their client's.

If we can accept this premise then training and business can be clearly linked.

Let us consider something which is obvious: business is linked to competition, therefore, by deduction, there is a certain element of competitively that training must bear in mind.

Let us continue with this series of syllogisms. It seems to be that this business spirit in the teaching field must be based on the principle of win-win in a competitive way and in the broadest sense of the word. (Deming 1989)

There are many ways to procure this element of competitively, one of them is to look for the difference, distinguish yourself from what the others do and how they do it, in order to open up a market, to offer a different service, and therefore to have more chances of success.

Concentrating on the client (pupil) to create a good relationship which is efficient and effective which delivers a 'profit' in the user and provides what each individual pupil really needs are aspects which differentiate us. This type of elements can be perfectly co-ordinated with *blended learning* or with *open training* and are intrinsic to the potential of web 2.0.

This situation, these possibilities for diversification, personalization, and differentiation of the various services, which individual clients demand, is the aura which surrounds the work of this company.

Because it is useful, because it allows us to tailor to the needs of each and every client, because it generates principles like those of 'win-win', because economy plus technology is viable and because it is flexible; these are just a few of our most outstanding characteristics, *blended learning* and *open learning* are becoming an essential part of this training company because apart from all those already mentioned, it allows, strengthens and facilitates business opportunities.

Offering a Different Approach

At the same time as society was changing its organisation, didactic organisation in education began to be questioned (Aiello, 2004), currently the debate is not about virtual versus live presentation. The general trend (Harvey, 1996) is to shift the focus from the teacher onto the learner, a focus which Master-D has had clear from its creation.

This is something which training companies have always understood: The most important thing is the person who is learning and their needs and that attention must be paid to them first and foremost, not on the contents of what he/she must learn or on the channel through which this information arrives.

Our principle is to offer solutions, not to pontificate about which is the best product or which has the best contents.

Since its outset, the mission of this company has been *to help the greatest number of pupils reach their goals in the shortest time using an adequate product and excellent service*.

If you pay attention to 'the correct product' and 'excellent service', it is very clear where the focus lies. Given that, as we stated above, learning is an individual and personal thing, the task of the training companies is not to influence learning, in fact we cannot do that. Its objective is to influence the accompaniment, the assessments as far as providing resources is concerned (both material and immaterial) which allows every single pupil to internalise and learn whatever they need.

The model, however, is based on each person; what he/she needs when they need it. Tutorials, certainly, but not at a pre-arranged time set at the beginning of the course (provided that this time coincides with the teaching staff's timetable- and doesn't clash with very important conferences!) The client calls the shots.

In our different approach, we are also convinced that the client does not have *carte blanche* to do whatever he likes simply because he is the client. We propose an itinerary for him to achieve his objective. From the beginning, it is clear that as he progresses with his studies and reaches milestones, the client/pupil gains access to new services, support and materials.

However, the work and the process of learning is up to the individual, but periodically, the pupil has to demonstrate that he is completing his part of the work and to ascertain that he/she has passed through certain points. The introduction of these *check points* transformed a company of distance learning into a company of *open training and coaching*.

In order to offer this excellent service which forms an essential part of the company's mission, we decided to implement an investment plan which has allowed us to create 50 delegations/branches throughout Spain with teaching, information systems and communications departments which make up more than three quarters of the total workforce. As we can see this is far removed from the notion that *blended learning* or *e-learning* is popular in training companies because they can keep the costs down.

So, to stay with this subject, in order to offer a service and provide the appropriate work which personal learning requires, this company has made important investment of effort in technology.

Technological Support

The very concept of technology offers a plethora of options, definitions and shades (which I do not wish to enter into today). For training companies that have made a clear choice for technology the concept of these elements covers tools as well as channels and different means of communication and we are referring both to tools which exist and future developments in I.T. even things which we cannot imagine today. (Fandos 2007).

Today the use of technology in education is unavoidable (Aguaded, 1996) now. In this society geared towards information no one talks about betting on technology. Any company which does not have technology (or which does not use it) either does not exist or has its days numbered. That is nothing new.

However which technologies are we talking about? All of them. Those which exist and those which will exist in the future, because for training companies these technologies are no more than a medium through which they can offer a faster and better service.

From this perspective, Master-D uses its own virtual campus (www.masterd.es) television via IP(www.mastervision.es) MP3, platforms (http://masterd.netlanguages.com/platform), (www.hispanoaula.com) DVDs, CDRoms, chats, forums, multi-videoconferences, and ways of making the most of ipods, ephones, etc Why? Because these media are channels which allow, not financial savings, but a better and faster customer service.

Taking all of this into account, the successful results that this model offers are not only due to the use of technology or the design of the contents or to the innovations in communications through MMS or SMS or e-mails or any other innovation. No again. The successful results are due to the sum of the elements, the personnel, support material, technical resources and technology.

This balance is what we have named in Master-D *open learning* a model of work which we can gladly share with anyone who wishes to find out more about it. For their own gain, let us not forget that all these elements come together to benefit the client/pupil.

A Look to the Near Future

How will these educational processes which are contained within *blended learning* be developed is something that we cannot guess. The role of the company is to be vigilant about what is available and how to take advantage of new opportunities. Today it seems that the web applications 2.0 (Blogs, Wikis, Podcast, Youtube, Flickr, Del.icio.us…) are excellent instruments for the collaborative, autonomous learner and these are really have a place in the market. We have not discovered anything new. (Marques 2008)

However once again from a business point of view, in themselves these possibilities are considerable. An idea, an innovative proposal, a possibility is relevant when it becomes soomething commercially acceptable. Escorsa (1997) defines innovation as *the process in which starting from an idea, an invention or recognition of a necessity, a product, a technique or a service is developed until it is commercially acceptable.*

The web 2.0 has a lot of possibilities which the market is gradually accepting and which training companies are incorporating. However this presents companies with other problems: What contents? Who creates the material? How should I organize it? How can I distribute these in accordance with the client's profile and needs?

These are just some of the questions which training companies must answer in order to be different and competitive as we said before.

It may be that whoever is reading these thoughts finds some incongruity with what we were discussing earlier. If the learner is collaborative one may think that the question we asked above 'What contents?' should not apply. The contents can be developed by networking, a working group that supports the web 2.0 And no, there is no incongruity because training companies know that the client and the network of pupils, effectively can create conditions and collaborative learning, but the client who pays, because he has the necessity, pays principally because he wants to be offered a solution. Of course, the solution cannot be that he resolves the problem himself. If that were so, why would he want the mediation of a company?

The problem however is clear.

The environment which surrounds web 2.0 is very interesting; however we must continue working on the creation of contents which develop all the potential of this setting.

There are more problems, I don't want to go into too much detail, but let us look at one more.

One of the most relevant potentials of the web 2.0, as we commented before, is the collaborative work which it allows. On the other hand, knowledge and technical expertise are elements or differentiating factors which some people do better than others, for example, a job interview, an official exam, a public exam. Some training companies find themselves in a dilemma, on the one hand learning can be better and make a more significant difference when it is done collaboratively; and on the other hand, showing all you know and sharing your expertise can be counterproductive when both have the same aspirations and are adversaries in a struggle to get the same place, the same job. How can the company reconcile the necessities of both clients?

Innovation

There is no doubt that compared with traditional training the new field of telematics virtual training seem very complex because among other things they are made up of a complicated organization of teachers, trainers (in Master-D's case) pupils, technicians and technology which all too often make communication difficultand for this reason, it is absolutely essential that in any organization that the internal philosophy and culture and the principles and values which sustain that culture and the commitment and mission of the business be fluid which fuels all the work of the collective.

Finally, after the explanation of this example is it feasible to ask, "What is the route that allows companies to live up to the expectations of its clients and at the same time maintain their competativity?" The answer is innovation.

To conclude, the phenomenon of *blended learning*, *e-learning*, and *web 2.0* is encouraging , in our opinion, a movement towards analyses, reflection. It is generating a lot of proposals and investments and the impact of this is not yet being noticed out with the training companies. However the movement does exist.

Innovation is the key element when explaining competitively. Training companies which are currently in the market (and want to stay there) are working intensely in all different kinds of innovation to provide answers to the questions which we have posed. Nowadays there is a lot of investment in research and there are all types of activities in the sphere of technical innovation, social innovation and innovation in managerial methods. And innovation is clearly orientated towards development of a financial potential starting from social requirements (Rodriguez2003).

In order to achieve real innovation, to create channels which really answer these social requirements, and if we are able to develop an interesting economic potential at the same time (Why give this up?). what we need is serious interdisciplinary and multidisciplinary work. Here there is a broad field of work to be done and we believe that business and universities, companies and administrations can work together. Society is asking this of us.

In the end, one matter remains clear, in our opinion, the raison d'être of institutions and companies who are dedicated to teaching is the learner; the most important thing is to offer a product and a service which guides the learner towards reaching his goals in such a way that allows him the greatest level of satisfaction, happiness and critical skills appropriate for his chosen field.

This is our objective and it is at your disposal.

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Editor's Note: This is an interesting, blending model of distance learning. We look forward to the additional statistics in student's evaluation of this blended learning, and also comparative statistics from instructors regarding student achievement in each model.

From Traditional Delivery to Distance Learning: Developing the Model

Marie F. Holbein

Abstract

Today's classrooms are no longer bound by geography. Distance learning has provided an attractive and increasingly highly regarded alternative to traditional face-to-face instruction. However, effective implementation requires a shift in thinking for both students and instructors. The purpose of this article is to describe a model for applying a traditional campus-based graduate course to a distance format.

Keywords: Distance learning, teacher education; Online learning, reading education

Introduction

Globalization has impacted education in that classrooms are no longer exclusively defined or bound by geography and the physical proximity between learners and instructors (Dabbagh & Bannan-Ritland, 2005). Distance learning has provided an attractive and increasingly highly regarded alternative for students who need more flexibility in managing their work schedules and who need to reduce their travel while pursuing their academic goals (Dabbagh & Bannan-Ritland, 2005; Dringus, 2000; O'Banion, 2005; King & Hildreth, 2001). The Internet has made a variety of sources of information accessible that expand opportunities for learning beyond material presented in lecture and textbooks (King & Hildreth). Using web-based technologies, students can engage in meaningful interaction with the instructor and with one another without being physically present in a classroom. To do so, however, requires a shift in course planning and delivery for the instructor and a shift in engagement for the students (Dabbagh & Bannan-Ritland). The purpose of this article is to describe a model for applying a traditional campus-based graduate course in diagnosis and remediation of reading difficulties to a distance format.

Theoretical Framework

Distance learning models vary from 100% to hybrid or blended (distributed) structures (Dabbagh & Bannan-Ritland, 2005). In a blended course, "one or more of the instructional events… occur while learners are separated by time or space (Dabbagh & Bannan-Ritland, p. 11). These events can be synchronous, asynchronous and independent learner-centered, or asynchronous and highly interactive in a real time environment that simulates face-to-face classroom interaction (Dabbagh & Bannan-Ritland, 2005; O'Banion, 2005). In all models, learners potentially may engage in multiple modes of interaction: learner-learner, learner-group, learner-content, and learner-instructor (Dabbagh & Bannan-Ritland).

Given the potential for expanding learning opportunities through the Internet, we must consider some basic precepts that govern the effective implementation of distance learning. The conceptual framework should embrace a constructivist paradigm whereby courses are structured with scaffolding to help students optimize technology tools for independent learning (Dabbagh & Bannan-Ritland, 2005). Instructors should continually assess and reflect on their teaching in that distance learning delivery is in many ways very different from traditional classroom delivery (Dabbagh & Bannan-Ritland, 2005; Dringus, 2000). A major challenge in distance learning is overcoming the potential for students' sense of isolation. Strategic and solid structures for social

learning can promote a sense of community (Dabbagh & Bannan-Ritland, 2005; Vygotsky, 1962). Effective communication techniques, consistent and timely feedback, and clear learning outcomes help students feel secure in meeting course expectations. Another distance learning challenge is helping students understand that "online learning is not traditional face-to-face learning in an electronic format**"** (Dringus, p. 189). Using these precepts as a foundation, I developed a distance learning model for a graduate reading course taught at in a southeastern regional university.

The Model

The course was developed in response to an increasing student demand for online learning. Making the transition from traditional to online delivery was challenging as the learning outcomes for the course were developed to conform to techniques for effective diagnosis and remediation of reading difficulties that require hands-on modeling and replication (Barr, Blachowicz, Bates, Katz, & Kaufman, 2007; Gillet & Temple, 2000; Jennings, Caldwell, & Lerner, 2006). The content and activities had to be modified to suit the distance environment, and students were required to become more independent in their learning and less reliant on face-to-face demonstrations.

Dabbagh and Bannan-Ritland (2005) emphasize the importance of an instructor's informed perspectives in the design and delivery of distance courses. Therefore, following my participation in a series of staff development sessions on distance learning and a review of literature on effective instructional design for online applications, I developed strategies for students' acquisition of knowledge, skills, and dispositions that "maximize their online learning experience" (Dringus, 2000, p. 194). Using the WebCt Vista course management tool, I determined that the course would best be suited to a blended model with limited face-to-face participation, modular distance learning structures, and independent applications of assessment.

Face-to-Face Participation.

Three class sessions, first day, mid-term, and last day, required face-to-face attendance in a whole group settings. According to Dringus (2000), student orientation to the distance format and learning structure is important for establishing clear expectations; therefore, attendance for the first meeting was required for continual enrollment in the course. The first day was devoted to a review of the syllabus, course requirements, procedures, and expectations (Dabbagh & Bannan-Ritland, 2005; Dringus, 2000; O'Banion, 2005). By meeting one another face-to-face and engaging in informal conversation, students were able to establish a sense of community (Dabbagh & Bannan-Ritland) that would support their development of a group project to be presented on the final night of class. Electronic issues such as ensuring computer accessibility, negotiating difficulties with technology, and providing information on tech support also were covered thoroughly during the first night orientation session (Dringus; O'Banion).

To mitigate the feelings of isolation and provide modeling (Dabbagh & Bannan-Ritland, (2005), the mid-term second required face-to-face session was devoted to modeling the application and interpretation of the assessment instruments. Video simulations of the assessment administration were accompanied by hands-on mock interpretations of results. Students worked in their group learning communities, discussed their findings, and shared their results with the larger class.

During the last class session, also a required face-to-face meeting, the community of students shared the results of their case studies and delivered their group presentations. The purpose of the presentation was to allow the students to explore more extensively topics pertinent to diagnosis and assessment. By sharing their work with the entire class a number of topics were covered extensively for the benefit of all.

The Distance Structure: Content Learning Modules.

Learning modules (see Table 1) containing assignments and prompts were structured to help students established a conceptual understanding for diagnosis and remediation of reading difficulties (Barr et al, 2007; Gillet & Temple, 2000; Jennings, Caldwell & Lerner, 2006). According to King & Hildreth (2001), assignments should be limited to "four to six questions that students could answer by referring to the notes and the textbook" (pg. 113). Dabbagh & Bannan-Ritland (2005) propose that assignments should focus on quality of questioning and cognitive engagement rather than length of responses. Students were instructed to respond to three-six probing and critical prompts based on assigned readings and instructor-developed posted PowerPoint presentations. They were subsequently required to read and reflect in writing on the postings from two class members thereby simulating the interaction that would normally occur in a classroom discussion. To provide a framework for reflection, students answered two questions: (a) What did I learn from reading the postings?" and (b) "How can I apply this learning to my teaching?"

Students need to pace themselves (King & Hildreth, 2001) and they need time to assimilate new learning (Dabbagh & Bannan-Ritland, 2005). Thus, instructor's assignments for students were posted weekly rather than all at once, and they were highly structured to facilitate timely and sufficient coverage of all information. Students were held accountable to due dates and times. In addition to the required readings and reflections on other students' postings, they also were encouraged to read one another's postings, and share their ideas through threaded discussions. I monitored those discussions to ensure that students were not harboring and communicating misconceptions about content and requirements. I provided modular links to pertinent literature, university resources, library holdings, resources from the internet at-large, and technological support. Students were free to explore these links and use the information as they needed to guide their work.

Independent Case Study Application

Following completion of the content learning modules, students actually administered the assessment instruments to a self-selected subject and compiled the results into a case study report with an accompanying plan of instruction. Dabbagh & Bannan-Ritland (2005) suggest that scaffolding can help achieve a balance between structure and independent learning. It promotes a sense of trust and support. In an effort to provide as much scaffolding and concrete example as possible, templates for the case study and the instructional plan were posted to a case study module that contained a completed sample of a case study and an instructional plan. Guidelines for assessment and using the instruments were provided along with links to pertinent literature.

Providing Feedback

Timely feedback is always important, but particularly in distance learning. Students are working rapidly to meet due dates, but if they are not given feedback as to the quality of their work, they will continue to make the same errors and become frustrated. I provided formative feedback using distance tools and engaging in telephone conferencing with face-to-face option. Most students selected the phone option. The literature suggests that a major challenge with online learning is the isolation that students feel and the alienation they sometimes experience from not having face-to-face support from one another (Dabbagh & Bannan-Ritland, 2005).

Dringus (2000) describes three types of feedback that can be used in online learning environments: immediate feedback (electronic tools such as group e-mail messages and postings), automated feedback (system announcements), and personal feedback (personal e-mail communications.) The three major tools I chose for communicating with students were pop-up window announcements to remind students of important due dates, group e-mail messages to answers questions and clarify instruction, and personal e-mail messages to comment on student

work. King & Hildreth (2001) underscore the importance of routinely answering questions and evaluating assignments by e-mail as it promotes student-instructor interaction. The grade book application allows students to see their points accrue as work is reviewed by the instructor. However, a written comment in a personal e-mail communication provides a qualitative dimension to assessment.

Dringus (2000) suggests choosing electronic tools to maximize students' control of their learning environment. Chat rooms were structured to provide students with an opportunity to meet with one another online as they needed to share ideas and discuss their progress (Dabbagh & Bannan-Ritland, 2005). This was an informal structure and participation was not required or evaluated. WebCt Vista e-mail was used to answers questions and provide feedback on assignments.

Dabbagh & Bannan-Ritland (2005) propose that online instructors need to continually monitor learning to provide necessary "guidance and support**"** (p. 79). I monitored my distance learning e-mail daily. However, if students needed more immediate individual assistance, they were able to contact me through my traditional and more frequently monitored office e-mail by sending a message with a Help subject heading. I responded to all requests for help individually and I followed up on WebCt Vista e-mail with a group Response to Student Request for Clarification to assure that no student was disadvantaged by missing important information.

Netiquette

The collaborative social learning environment in distance learning requires a new set of protocols for communicating (Dabbagh & Bannan-Ritland, 2005). I provided the following guidelines for communicating on the internet: (a) Typed communications do not reflect body language or nuances of speech. Misinterpretation of ideas is possible, therefore, choose your words carefully; (b) Promptness in posting assignments is essential for interactive participation. Late submissions disadvantage others particularly when the class is required to read and react to postings from others; and (c) Use of electronic format should be restricted to course-related conversations and purposes only.

Conclusions

Distance learning will continue to be a major format for delivering instruction. The demand is evident in that given the challenges associated with negotiating this new environment, students continue to want more offerings. Distance learning may not be for all students. Some who require a great deal of face-to-face interaction, structure, and modeling accompanied by verbal and non-verbal feedback may not be comfortable in a distance course. Distance delivery requires instructors to spend a great deal of time preparing in advance, anticipating student questions, putting structures in place to scaffold learning, and reading/responding to students' work. Time management is at the forefront as both a benefit and a challenge. Students have the flexibility to work when and where they choose, however, they must manage their time to accommodate the increased amount of work associated with working independently. What would normally be covered in a lecture and class discussion must now be extracted through deep and introspective probing and reflection. Instructors must be prepared to invest time in planning to ensure that students are clear about their goals and expectations. For me, the message is clear. A graduate reading class that focuses on modeling, simulations, and hands-on applications of diagnosis that were traditionally delivered in face-to-face environments, can be successfully applied to online learning. The key factors appear to be in knowing what courses to apply and to what extent they will be online. Some courses, such as this one, will require a modicum of face-to-face interaction. But, as technology continues to evolve, new sources will become available to link students to simulations that will supplement what we have traditionally accomplished in a classroom. In the final analysis, we may find that as King & Hildreth suggest (2001), we actually have more personal contact with students, and we may discover that it is possible to have probe more deeply

into learning by allowing students to independently explore the Internet resources available to them. Sitting in a classroom and listening to a lecture or small group discussion can actually be quite passive. Online learning is active and alive. Beyond the technology and instructional design lies the human element. Students want and need to be connected. The challenge for instructors is to help them build a sense of community so that while they may not see one another face-to-face, they know one another and share their ideas thereby contributing to learning for all.

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Editor's Note: This paper raises questions as to the comparability of the groups. Did the same presenter record Fall and Spring Lectures? And if so, to what extent, if any, did this affect the outcomes?

Does Source of Recorded Lectures Affect Exam Performance of Distance-Based Pharmacy Students in a Therapeutics Course?

Eric Hoie, Gary Elsasser

Abstract

Objective: Determine if the source of recorded lectures to distance pharmacy students in a therapeutics course affects exam performance compared to on-campus learners.

Design: Distance students were given audio files of lectures, recorded during the previous year, for the fall semester. For the spring semester they had access, within 24 hours, to lectures given to campus students. Exam performance of distance students was compared to campus students both semesters and distance students were surveyed for their preference of audio file source.

Assessment: Campus students scored significantly higher on 4 of the 5 fall semester exams than distance students ($p<0.05$). In the spring semester distance students and campus students each scored significantly better on one exam with no difference on the remaining three exams. Twenty-five of forty-seven distance students enrolled in the course completed a survey. Previously recorded lectures were preferred by 13 (52%) students with 12 (48%) students preferring recordings of the current semester's lectures. Eighteen students (72%) said recordings of current semester's campus lectures better prepared them for exams while 7 (28%) students said previously recorded lectures were better preparation.

Conclusion: Recordings of the current semester's lectures given on campus may improve exam performance of distance students.

Keywords: Distance-based, lecture, therapeutics, exam

Introduction

Creighton University's School of Pharmacy and Health Professions enrolled its first pharmacy distance pathway class in the fall of 2001[1]. The distance-based Pharm.D. pathway offered by Creighton University is the first of its kind. The majority of the didactic work is provided over the internet, although unlike most distance-based programs our distance students complete the majority of their didactic work at the same time and pace as their campus classmates. Lab courses and other practical experiences are completed during intensive summer sessions. With the introduction of the distance pathway, efforts were made to ensure campus students and distance students received similar educational experiences. Distance and campus students use the same course materials and the same instructors were responsible for course content and exams for both pathways.

During the first two years the distance pathway was offered, all required material was provided by means of handouts, slides, and textbooks. Lectures were not recorded as it was expected that all required material would be on a course website. Performance of the distance students was compared to campus students in each course and at the end of the second year the students had completed fourteen courses. There was one course in which distance students performed statistically better than the campus students with no difference in the other thirteen. Similar results have been reported previously at other institutions for individual courses[2, 3].

Prior to the fall 2003 semester it was decided to provide distance students enrolling in therapeutics with lecture recordings in the form of synchronized slide and audio files on a CD.

The audio portion of the files was from the previous year's lecture or was recorded during the summer by the faculty member who would lecture in the fall. As the fall semester progressed, we observed that distance students were not performing as well as campus students on the therapeutics exams. This was unexpected as the two groups had performed similarly during the first two years. Since the only major difference between the campus and distance students was access to "real time" lectures, it was decided to record lectures during the spring semester and provide them to distance students. As that was the only change made from fall to spring we compared exam results from both semesters to determine if the source of the audio files might affect exam performance of the distance students.

Design

In the fall semester of 2003, 47 students in the distance pathway and 97 students in the campus pathway enrolled in the therapeutics course. The course is a two semester sequence, in the third professional year, worth seven credit hours each semester and is team-taught with 10-12 instructors each semester. All students, distance-based and campus-based, enrolled in therapeutics were provided with the same lecture handouts for both semesters of the course. Before the first semester, distance students were provided with CD's containing slides, handouts and previously recorded lecture audio files. The slides and audio files were synchronized so distance students could view and listen to lectures in a similar fashion to campus students. In most cases the audio files were from lectures given on campus the previous year. If a recording of the previous year's lecture was not available, or if a new instructor was scheduled to lecture in 2003, the lecture was recorded during the summer of 2003 in the faculty member's office.

Distance students enrolled in the spring semester of therapeutics accessed handouts and slides from the course website. These materials were identical to those available to campus students. All lectures given to the campus students were digitally recorded, compressed, and placed on the course website the same day.

There were five exam dates each semester. Both groups of students were administered identical exams on each of the 5 dates. All campus students completed their exams during a three hour period on paper. Distance students were given a 36 hour window to take their exams which were completed on computer under the supervision of a proctor. Following each exam, the performance of distance and campus students were compared. Mean scores for each of the exams were compared using the Student's t-test with a p value <0.05 considered statistically significant.

Near the end of the spring semester distance students were asked to complete a two question survey on their preference of synchronized lectures on a CD versus having access to the most recent lectures and on which method better prepared them for exams.

Assessment

Campus students achieved significantly higher scores on four of the five exams during the fall semester and had a significantly higher semester average compared to distance students (Table 1). During the spring semester, campus students achieved a higher score on one exam, distance students achieved a higher score on one exam, and there were no differences on the other three exams (Table 2). There was also no difference in the overall semester average between the two groups.

Twenty-five distance students completed the survey. Thirteen students (52%) preferred the synchronized files provided on a CD prior to the semester and twelve (48%) preferred having access to current campus lectures. Eighteen students (72%) said recordings of current lectures better prepared them for exams and seven (28%) felt synchronized files better prepared them.

Table 1
Fall Semester Exam Performance

	Exam 1		Exam 2		Exam 3		Exam 4		Exam 5		Semester Mean	
	Campus n=97	Distance n=47	Campus	Distance	Campus	Distance	Campus	Distance	Campus	Distance	Campus	Distance
Mean	79.9*	73.7	80.1*	74.1	86*	81.4	78.3	75.6	84.6*	73.9	81.8*	75.7
Std Dev	10.7	15.5	9.7	6	6.6	9.3	9.9	11	8.2	9.7	3.3	3.3
Low	46	41	47	50	64	64	47	50	51	51	79.9	73.7
High	99	97	96	93	99	95	96	97	97	100	86	81.4
Median	80.5	77	83	74	87	82	78	78	85	74		

All values expressed as percentage

* $p<0.05$

Table 2:
Spring Semester Exam Performance

	Exam 1		Exam 2		Exam 3		Exam 4		Exam 5		Semester Mean	
	Campus n=97	Distance n=47	Campus	Distance	Campus	Distance	Campus	Distance	Campus	Distance	Campus	Distance
Mean	82.1	88.9*	81.1	84.1	81.1	81.7	84.4	84.2	87.5*	84	83.2	84.6
Std Dev	7.3	7	9.2	10.1	7.7	7.7	7.3	9	5.8	9.8	2.7	2.6
Low	59	72	54	57	62	62	64	60	70	64	81.1	81.7
High	97	99	97	98	94	98	100	100	97	99	87.5	88.9
Median	83	91	82	86	82	82	84	84	89	84		

All values expressed as percentage

* $p<0.05$

Discussion

The impact of audio files on distance student learning has been studied in a variety of settings[4-6]. Embi et al. reported that medical students preferred the ability to download and review slides with audio over audio alone[4], while Solomon et al. found that medical students who viewed digital lectures performed as well on examinations as a similar group of students who viewed the lectures live[5]. Spickard et al. randomized medical students to view a lecture with or without

audio[6]. Students expressed a benefit from audio files and a trend towards improvement in student learning was noted.

What makes Creighton University's pharmacy program unique is that two groups of students, campus and distance; complete their courses in the same time-frame, with the same instructors and materials, and both groups of students take the same exams and quizzes on the same days. These two groups of students completed the same 14 courses during the first two years of the program and in only one course was a difference in performance noted, and in that course the distance students performed better than campus students. During these two years, distance students did not have access to audio files of lectures and it is possible instructors wrote exam questions based only on handouts, slides, and assigned readings. Therapeutics instructors, knowing that distance students had audio files of their lectures, may have included exam questions from lecture material that might not have been in their notes.

Why campus students performed better on exams in the fall semester and exam performance improved for distance students in the spring semester cannot be determined with certainty, but it is possible that having access to the lectures given to campus students was a significant component. For the fall and spring semesters both groups of students had access to the same handouts and slides and while campus students can ask questions in class distance students will frequently email instructors with their questions. The only change made between the two semesters was the source of the audio files. From year-to-year, content of lectures may not change significantly but points of emphasis may. An instructor may emphasize content that a previous class struggled with on exams. Questions from students during lecture likely differ from one year to the next and may lead to a more thorough discussion of a topic. If instructors are in the habit of providing tips or clues for an exam these may also differ. While points of emphasis or tips given during a lecture may not be significantly different from year-to-year, it may account for the difference we observed in exam performance.

There was no clear preference for one delivery method. The most common reason given for preference of synchronized lectures on a CD was convenience. No internet access was needed, the slides and audio were synchronized, and students could work at a faster pace if desired. Having access to the current lectures was more time consuming for students. The files required downloading and the students no longer had synchronized files which required them to determine when they should advance slides while listening to the lecture. The majority of students thought access to current lectures better prepared them for exams. The most common reason given for preference of the current semester's lectures was having access to the most current information. Students heard the same lectures as the campus students and had the most current information provided by instructors.

With the improvement in distance student performance during the spring semester we conclude that providing access to the most current lectures improves distance student examination performance.

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