Learning Technology

publication of

IEEE Computer Society's

Technical Committee on Learning Technology (TCLT)

Volume 13 Issue 2 | ISSN 1438-0625 | April 2011

From the Editors …

Welcome to the April 2011 issue of the Learning Technology newsletter on Advanced Learning Technologies for Disabled and Non-Disabled People.

The rapid evolution of ICT offers unprecedented opportunities for the integration of disabled people in the society. Advanced learning technologies can adapt to the needs, requirements and preferences of each individual user, therefore they can provide equal access to *all* students. In fact, even the term disability is re-defined in this context, as "*a mismatch between the needs of the learner and the education offered; it is therefore not a personal trait but an artifact of the relationship between the learner and the learning environment or education delivery*" (http://www.imsglobal.org).

This issue introduces some papers which address the development of learning technologies for disabled and non-disabled people. Morris describes his personal experience as well as the results of a study which investigates how technology can change the education and life of people with spinal cord injury. Chatzara & Stamatis focus on adults with learning difficulties and attention disorders, and claim that the simulation of emotional intelligence in a computer system can have a positive impact on the way users interact with the system and in learning overall. Mancilla & Muro describe the development of tangible interfaces to support teaching of reading and writing for children with Down syndrome. Minotti et al., outline some guidelines, tools, etc, for supporting Universal Design for Learning. Huglin et al., outline some guidelines for making online courses accessible by disabled users/learners. Finally, Johnson & Klenner-Moore describe DyKnow, an eLearning system used across different universities to facilitate access to various learning resources for both able-bodied and disabled users/learners.

The issue also includes a section with regular articles (i.e. articles that are not related to the special theme). Johnson et al., present the results of a survey which investigated student perceptions of a CMS in a particular university. Queirós & Leal describe an eLearning environment (currently under implementation) for programming languages learning. Finally, Konetes & Leidman discuss the technical and pedagogical aspects involved in the development and operationalization of an online media production course.

We sincerely hope that this issue will help in keeping you abreast of the current research and developments in learning technologies applications for disabled and non-disabled people. We also would like to take the opportunity to invite you to contribute your own work on technology enhanced learning (e.g. work in progress, project reports, dissertation abstracts, case studies, and event announcements) in this newsletter, if you are involved in research and/or implementation of any aspect of advanced learning technologies. For more details, please refer to the author guidelines at http://www.ieeetclt.org/content/authors-guidelines.

Special theme of the next issue:	**Adopting Standards and Specifications for Educational Content**
Special issue editor:	**Prof. Luis Anido Rifón** Universidade de Vigo, Spain lanido@det.uvigo.es
Deadline for submission of articles:	**May 31, 2011**

Articles that are not in the area of the special theme are most welcome as well and will be published in the regular article section!

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Special Theme Section: Advanced Learning Technologies for Disabled and Non-Disabled People

Learning to live with spinal cord injury

Spinal cord injury (SCI) is catastrophic, in an instant it destroys lives, it smashes hopes and dreams. Being able to live independently with SCI requires an individual to relearn the most basic everyday things like, dressing, toileting, washing, eating, healthcare etc. In fact it's easier to say everything that involves any movement needs reassessing and adaption to some degree. This can be quite a problem, I know this first hand I'm tetraplegic as a result of a spinal cord injury. The key to being successful and get the most out of the rehabilitation process is to frame everything as a problem in your own personal context, and use a problem solving strategy to develop a solution. The traditional method of learning to live with SCI is being taught to obey a set of rules unrelated to the individuals past experiences. Clearly one size fits all approach is unsatisfactory, what does an individual do when faced with a new or changed situation? It is unlikely to come with a rule book.

Successfully living with SCI involves successfully learning.

I've always been curious about how education can improve the quality of life of people with an acquired, life changing condition such as spinal cord injury.

Currently I'm in my 2nd year of a PGCE at Cardiff University; I'm also a volunteer IT tutor at my local SCI rehabilitation unit. My personal experience of working as an educator at the spinal unit has shown that the patients are generally keen to learn new IT and assistive technology skills in addition to learning the skills necessary to survive and thrive. The equipment we currently use, such as Dragon Naturally Speaking and the Smartnav head mouse combined with the PC are ideal forms of learning technologies for the spinally injured. They allow total computer control and, importantly, they are relatively inexpensive. These adaptations have allowed individuals with SCI to be on a reasonably equal footing with the able bodied in terms of IT use, and they can be easily used in any learning environments. As a result of my work in educating patients during the rehabilitation process I developed a hypothesis - 'can education post SCI help to improve the quality of life'- and was keen to test it out. There is a surprising lack of research regarding returning to education post spinal cord injury so I was eager to examine the issues.

Luckily the Cardiff PGCE includes a small scale research project. A small 7 question online survey was created, the survey asked respondents at what age and how soon post injury did they return to education, and to describe the ways in which it was beneficial to living with SCI, links to the survey were placed into several SCI online forums explaining the purpose of the research, and kindly asking for cooperation. This approach overcame the geographical spread of SCI individuals, and yielded a decent amount of respondents (40 in total)

When I began to analyze the results I was touched by the candour displayed by each respondent, each survey represented a personal journey from devastating injury back to relatively normal, if a little different, way of life, via various educational routes. They mirrored my own educational journey since 1997, when I was injured in a fall aged 25.

In total 40 respondents completed the survey, 31 had returned to Education post injury, 9 had not RTE post injury. These 9 were excluded from the study. 31 (100%) of the respondents said that they found a return to education to be beneficial in dealing with spinal cord injury. The definitions of beneficial in these instances were many and varied, to learn new skills, to overcome boredom, social interaction, retrain for a new career, and relish the mental challenge.

The data also shows that more SCI individuals are returning to education in the last decade than in the previous 50 years, showing that education has become accessible due to the ADA/DDA ensuring better access to disabled students, provision of online courses, advances in assistive technology, better support from the educators, and wider availability of funding providing access to courses. All SCI individuals had gained employment after leaving education.

In summary, it is not claimed that education post SCI is a panacea to all the problems of living with spinal cord injury but the benefits of a returning to education can help in improving problem solving skills, intellectual stimulation, communication, physical interaction, forming friendships

As a SCI individual one gets bombarded with pessimistic statistics daily, significantly higher risk of death due to secondary complications, extremely low chance of recovering functional movement. It is good to produce some positive statistics, and to say to the patients these are my findings, they show positive advantages to returning to education post injury.

The advantages are not particularly revolutionary, or even new they are experienced by everybody who attends a lecture or goes to a class on a daily basis but when applied to an individual with a spinal cord injury they can lead to greater empowerment and increased quality of life.

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Emotional communication in e-learning scenarios for students with attention disorders

Abstract. Emotions play a primary role in human intelligence, decision making and learning. We propose an e-learning system that has the potential to accommodate personalization, based on learners' profile and emotional behavior. Our research focuses on adults with Learning Difficulties (LD) and attention disorders and claims that the simulation of emotional intelligence in a computer system can have a positive impact on the way users interact with the system and in learning overall.

Learners often spend a part of their time learning through computers. Researchers report that learning must be understood as a social process rather than the straight perception of knowledge (Gareis, 2006; Beale & Creed, 2009). They also argue that the social aspect of learning is diminished when it is done online.

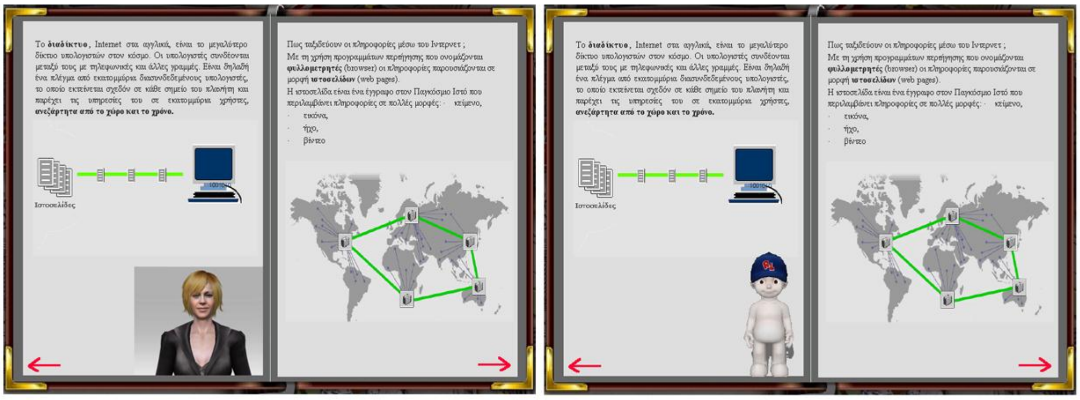
A critical factor of the social aspect of learning is the emotional communication between students and educators. This emotional behavior that a teacher needs to adopt in a physical classroom is different for each group of learners. It depends on their personal characteristics and is missing in e-learning applications due to the physical absence of the educator. This is relevant to all groups of students; our research though, focuses on students with LD who often have attention disorders and low self-esteem due to continuous unsuccessful completion of learning tasks. They often find it difficult to organize the learning environment, manage their time and interact in a social context. Researchers argue (Beale & Creed, 2009) that the use of agents may contribute to this obstacle through their possibility to portray emotional reactions and adopt their behavior accordingly to user's emotional states.

Providing applications that simulate emotional intelligence and human behavior requires a radical change in how people perceive computers in general and learning in particular. The interaction between users and agents that have adaptive behavior is complex (Kort et al, 2001) especially if this behavior is adopted regarding user's emotional states.

We propose the use of an intelligent emotional pedagogical agent to improve the communication between the user and the machine for distance learning systems that might serve for better interaction and create a social environment for learners from different backgrounds.

We use an intelligent emotional agent who feels empathy for the user (rewarding him for good results, give him courage for bad results), "understands" her emotion and adapt accordingly. The genre of the application affects the emotional process too. The fact that the agent not only adapts its own behavior but adapts the interface of the application itself in order to suit to the individual' s with LD, needs and preferences, creates a personalized version of the application which cutters for the specific student. This happens as a dialogue between the agent and the user so the student is always aware of the changes that take place in the application, therefore she feels in control of the educational procedure.

This e-learning model does not cutter for all students with LD. For instance learners with autism which have LD too and attention disorders need another pedagogical approach. Previous work (Sansosti & Powell-Smith, 2008) showed that they do not correspond well to emotional reactions due to their difficulty to recognize emotions. This kind of communication may be perceived negatively for this group of learners.



Two instances of the e-learning environment with personalized agents.

In order to incorporate adaptiveness in a structured and coherent way ontology and adaptation rules for behavior representation are included in our study.

The combination of all media in animated agents gives them the ability to show empathy, comfort, and sympathy for the users and might have the potential to improve the quality and the effectiveness of education (Baylor & Kim, 2003; Lee et al. 2007). Emotions have been introduced in order to establish high degree of communication between the application and the user (or users). Research that took place in MIT (Kort et al, 2001) addresses the emotions that are relevant in learning: Anxiety-Confidence, Boredom-Fascination, Frustration-Euphoria, Dispirited-Encouraged, Terror-Enchantment. We used that axis in our work and these are the emotions that are portrayed through rich multimedia in agent’s behavior.

The agent is able to “understand” how the user feels by “recording” user’ actions and result to conclusions about user’s emotional state. The user profiles that are feed into the system give some initial information about the user. This information is added up to the assumptions that the agent makes about user’s emotional state. The information that the system collects (from user’s direct input and from user’s actions) are feed into the model. The learning algorithms are linked to the emotional process as we conceive learning and emotions as related units of the model. With the use of Intelligent Emotional Agents, a more efficient communication channel between the user and the machine is created that can improve the distance learning development for all users, respectively to their own personal learning profile.

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Tangible Interfaces to Support the Teaching of Reading and Writing to Children with Down syndrome

Introduction

Teaching how to read and write to a child with Down Syndrome (DS) is a hard educational task that requires special educational techniques. This syndrome causes disorders in the mechanisms of attention, state of alert, memory, correlation, analysis, and abstract thinking. Taking all these characteristics into account concludes that the learning is slow and is necessary to follow a step by step process [1].

Nowadays, there are educational methods specially designed to consider the characteristics previously mentioned for teaching a person with DS. One of these methods, is the published in the book "Down syndrome: Reading and writing" (from now on: Troncoso's method) [1].

The pedagogical approach that the book applies is the discriminative-perceptual learning. This is, teaching a kid to perceive sounds and relate them to actions or objects (e.g., repeat several times a written word to relate the writing to the sound). In the same way, the children can learn to discriminate among various elements to choose from. An example of the utilization of the method will be explained:

Material:

- *Image-card*. Contains an image and underneath the image goes a word that represents it (see Figure 1 left side).
- *Word-card*. Two of these are required. It has the same word that was used in the image-card (see Figure 1 right side).

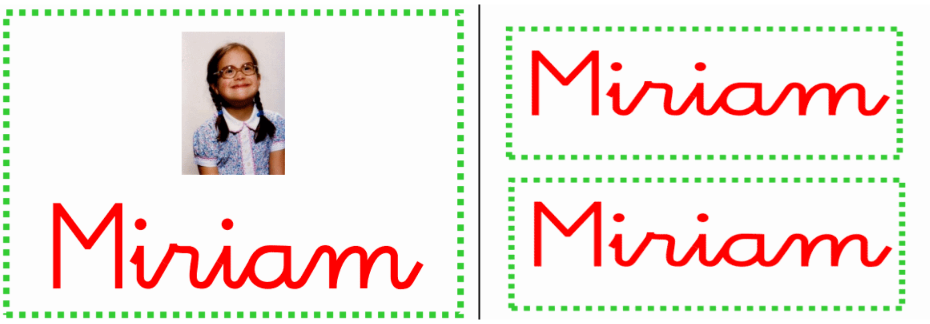

Figure 1 - Image-card and word-cards

Exercises:

1. The teacher reads the word in the image-card repeatedly, pointing at it. Then, the teacher asks the kid to read the card.
2. The teacher points at the child that both cards have the same word written on them, and he asks the kid to read the card. After that, the teacher indicates the kid to put one word over the other saying "Put Miriam over Miriam".
3. The kid needs to know that both cards have the same word and that the word represents the image of the image-card.

The purpose of these exercises is that the child can relate the word to the image and recognize the word without the image.

This investigation proposes the use of the mentioned method enhanced through the interaction with computationally-increased physical objects. This work mainly aims at examining the potential of tangible interfaces for supporting innovative pedagogies such as learning of children with DS.

Tangible interfaces

It has been proven that using tangible interfaces offers some benefits in supporting teaching [2], have been tested on children with autism, which is a condition with attention deficit that is also found in the DS, demonstrating favorable results [3]. Studies like [4] show that are useful because they promote an active participation, which helps with the learning process. These interfaces do not intimidate non-expert users and encourage exploratory, expressive, and experimental activities. Figure 2 shows an analytic framework that explains the factors that might influence whether tangible interfaces might support learning and how they can do so.

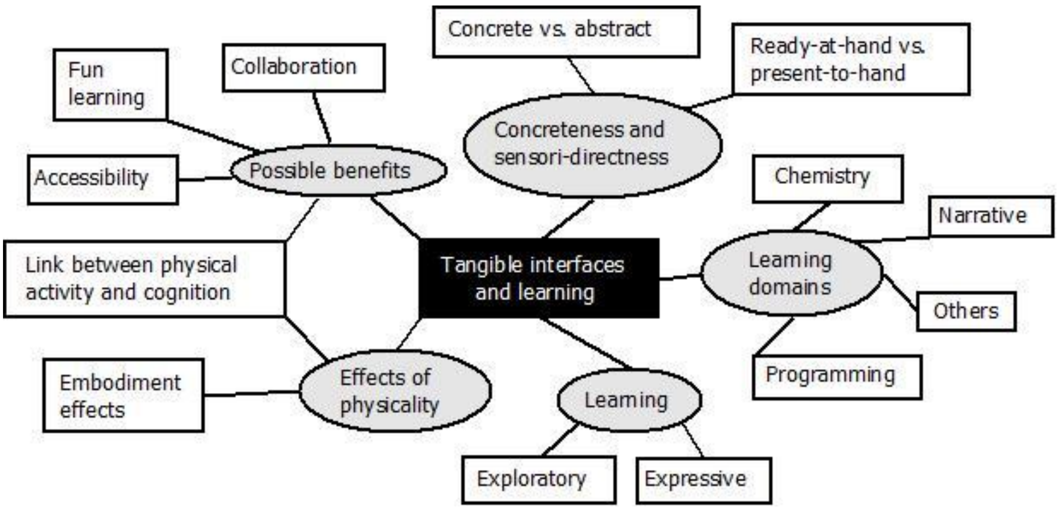

Figure 2 - Analytic framework on tangible interfaces for learning. Source: [5]

Using these results as a departure point, tangible interfaces will be used in this research in order to prove their feasibility. Therefore, a design of an interactive multi-touch concept has been proposed, with an integration of tangible elements and software applications using pedagogical fidelity that refers to technology's representation with pedagogical accuracy.

The user interface is a tabletop and a group of tools digitally augmented (didactical material for the used method) that includes models of the picture-cards and word-cards, these ones would be labeled with augmented reality tags so they can be recognized by the software. To illustrate the functionality of the system, we present the following usage scenario that describes how a child would interact with their tabletop and the tangibles items:

Patty is a child with DS, she goes to a special school that fits her needs. This school uses the Troncoso's method [1] applied into a tangible interface. Patty takes classes using it, twice a week she gets at school early for her classes. In these interventions, her teacher uses the technology with an exercise of relating a picture to a word, projecting an image-card and *giving her three different tangible items. Patty has to choose the item that correspond to the projected image and put it on top of it.*

Architecture

In order to achieve the system's functionality we are proposing a multi-layer system. Next, we describe the system's architecture (figure 3).

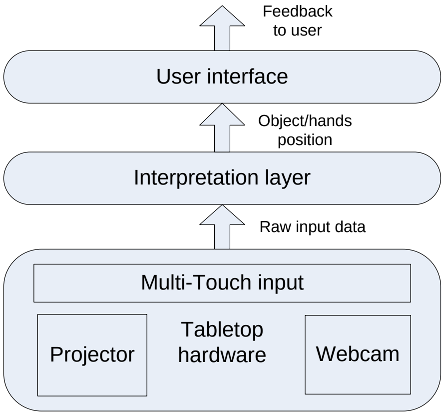

Figure 3 - Architecture overview

The lower layer is the hardware layer which generates the raw data tracking in format of a video stream; this is by using a projector and a webcam.

After that, the information is interpreted by the interpretation layer which translates the movements of the hands into gestures and recognizes the augmented reality tags on the tangible objects.

At the end, the user interface layer, this layer takes care of generating the visible output for the user. It receives the events of the interpretation layer.

Conclusions

This work in progress propose to improve the process of learning of reading and writing to children with DS, through the use of tangible interfaces. With the implementation of this system we pretend to make an impact on children with this syndrome and eventually to help the Troncoso's method to give better results through technology.

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Online Course Design for Individuals with and Without Disabilities: Pedagogy, Tools, and Universal Design for Learning

Abstract

In this article, online course design pedagogy and tools are discussed for both disabled and non-disabled online learners. Additionally, important principles, resources, and tools for Universal Design for Learning (UDL) are addressed.

Pedagogy

A common theme related to online learning and pedagogy is that there is disappointment in the lack of pedagogical innovation or change in relation to the expansion of e-learning and online course delivery (Hannon & D'Netto, 2007; Juhary, 2007). It is often noted that the courseware, the tools for online course delivery, are prohibitive to innovation and change, that these tools are instead designed for administrative purposes to "manage learners" (Kim & Bonk, 2006, p. 26) and "facilitate the process of learning-management delivery" (Juhary, 2007, p. 379). Thus, the same pedagogical issues that haunt face-to-face courses are exacerbated in online courses. Where online courses should be learner-centered, they remain teacher-centered and where they should be providing rich learning environments that are interactive, project-based, and collaborative, they are places where learners feel isolated and lacking in peer engagement (Hannon & D'Netto, 2007; Juhary, 2007).

These pedagogical issues become even more problematic for learners with disabilities. While e-learning and online course delivery present endless opportunities to foster deep understanding of contextual materials and information (Bonk, 2009), online course designers are confronted with a plethora of challenges presented by adults who are either new to, intimidated by, or in some way prohibited by technology innovations, Web 2.0 tools, and new methods for acquiring information online (November, 2008; EDUCAUSE, 2003).

Pedagogy underlying online course design recognizes that that there is more than one method for instruction, for no one technique can meet the needs of every user. This is especially true for adults with disabilities, for whom the Internet may be their primary vehicle for learning, accessing information, and communicating with others (Kaye, 2000). With this in mind, it is critical that online course designers take into account the many individual differences among learners, especially individuals with disabilities who acquire knowledge in different ways. Presenting materials in numerous ways depending upon the needs, learning styles, access issues, and preferences of all users is critical to online course design (Chen, 2010).

Tools

New technologies for non-disabled learners are emerging at a prolific rate, concurrent with trends toward greater interactivity and collaboration and more learner-generated content (Bonk, 2009; Goswami & Gokulnath, 2010). These technologies include tools such as YouTube (video creation and hosting), Google Docs (collaborative document creation), Delicious (social bookmarking), Skype (webconferencing), VoiceThread (multimedia discussion), and Synote (multimedia web resource management).

New technologies for disabled learners are not as prolific, yet there is continual development for tools that enhance accessibility when designing online courses for disabled learners. Tools for the visually impaired include RoboBraille (text to Braille or audio), Audacity (audio creation and editing), and VoiceOver (powerful screen access application for Apple devices). Tools for the hearing impaired include CCforFlash Player (caption-capable Flash video player) and YouTube (closed-captioning).

One excellent tool everyone should have bookmarked is the Web Accessibility Evaluation Tool (WAVE), offered free of charge by WebAIM (www.webaim.org). WAVE aids online designers by offering a Web accessibility evaluation tool that marks the original web page with embedded icons and indicators that reveal accessibility issues contained on that page (www.WebAIM.org). In addition, the International World Wide Web Consortium's (W3C) Web Accessibility Initiative (WAI) was created in order to ensure full Web accessible for individuals with disabilities (www.w3.org/WAI) and is one of the foremost authorities on web accessibility.

Universal Design for Learning (UDL)

While none of these technologies guarantee full access to online course content for disabled learners, a number of promising tools, such as WAVE, are emerging for evaluating accessibility and designing and/or revising online courses to fully meet Universal Design for Learning (UDL) standards. Principles underlying UDL must be applied when designing online courses (Schelly, Davies, & Spooner, 2011) in order to eliminate as many barriers as possible. This includes everything from utilizing the accessibility tools provided by the CMS, to designing alternative formats to products, resources, and media, and ensuring that various modes of computer-mediated communications (i.e., online forums, blogs) are accessible to every student.

Fully appreciating the need for UDL will ensure full access for all users, including individuals with disabilities; participants using text, voice, screen readers, earlier versions or text-based browsers; adults with varying levels of literacy, comprehension, fluency of language(s), and learning styles; individuals whose comfort level and familiarity with technology is new or low; and everyone who has a slow Internet connection, timed access, or limited access (Coombs, 2010).

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Maximizing Accessibility in Online Courses

Introduction

The population of students with disabilities at the postsecondary level in the United States has grown from 9% in 2000 to nearly 11% in 2008; this upward trend is expected to continue in the future [1]. At the same time, the number of postsecondary courses offered online has also increased substantially. According to a report commissioned by the Sloan Consortium [2], more than 20% of higher education students in the United States were enrolled in at least one online course in the fall of 2007, representing a 12% increase over 2006. It seems likely, then, that the number of students with disabilities enrolled in online courses will increase as well.

In their creation of online courses, instructional designers may inadvertently overlook the needs of learners with disabilities. However, creating accessible online courses isn't merely a "nice to do" activity; it is required by federal law. Section 504 of the Vocational Rehabilitation Act of 1973, for example, specifically prohibits discrimination against individuals with disabilities by any federal agency receiving federal funds; this includes colleges and universities.

Two high-profile lawsuits have been filed recently by the American Federation of the Blind (AFB) and the American Council of the Blind (ACB). The first case involves a pilot project undertaken by a coalition of universities in conjunction with Amazon.com to test the use of Amazon's Kindle DX electronic book reader in the college classroom. Although the Kindle DX had a "read-aloud" feature, the controls to access this feature were inaccessible to individuals who are blind [3]. The second case, filed by the AFB on behalf of blind students and professors at Penn State, cited "pervasive and ongoing discrimination" due to inaccessible technologies used on campus [4]; technologies cited include learning management systems used for online courses, departmental web sites, and the university's library catalogue.

Designing with Accessibility in Mind

Fortunately, the online environment can be adapted fairly easily to make course content accessible to students with disabilities; numerous articles and websites are available to assist with this task [5-7]. When designing your course, keep in mind the needs of students with visual or hearing impairments, as well as those with cognitive or motor disabilities.

Ensure your online course is easy to read and understand. Keep language simple and conversational, using as few words as possible. Although unique fonts and backgrounds increase the visual appeal, these features can make websites difficult to operate for people with disabilities. Large, plain text and high color contrast are best for people with visual impairments. If possible, offer picture magnification or include a short job-aid explaining where students can find the picture magnification option on popular browsers.

If you use color as a method of categorizing topics or coding items, ensure that there are other designations such as shapes, patterns and color, or text and color, so someone who is color blind or has a visual impairment can understand the coding.

Make sure you've offered multiple options for how information is represented in an online course. For example, include captions or transcripts as alternatives to audio files for students who are deaf or hard of hearing. Many people with visual impairments use screen readers that will read text aloud; thus, it is important to include textual descriptions of photos and graphics for students who fit this category. Ensure that there is a text equivalent for every non-text object on the page; this should describe the purpose of the graphic, image, or sound. Most learning management systems offer instructors the option of adding an Alt-Tag to such objects, ensuring that all non-text elements of the course are accompanied by a text equivalent. Hyperlinks should provide users with alternative text to describe where the link will take them. Keep in mind, though, that the descriptions should be relevant to what they are captioning and also be helpful to the reader; an Alt-Tag that says “click here” is not informative.

Because screen readers only read text from left to right, it’s important to label tables with row and column headers; this will allow a user with visual impairments to make sense of the data contained within the table.

If you are converting documents to PDFs, make sure that you save them as text, rather than as an image. When PDFs are saved as text, screen readers can understand them. If you are scanning documents and don’t have access to the original, try scanning them in as a word processor document using optical character recognition (OCR) software, and then converting them to a text PDF. PDF documents can also be tagged to increase accessibility. More information on PDF accessibility can be found at http://www.webaim.org/techniques/acrobat/

The course should include a link to the institution’s Americans with Disabilities Act (ADA) policy, if available; a statement explaining to the students how to access the institution’s disabilities support services should be included as well [8].

Conclusions

The explosion of online learning in recent years has provided new learning opportunities for people with disabilities. With mindful planning, course content can be made accessible to students who may have been unable to participate in the past, allowing accommodations and preferences for them so that they can participate in the learning process with their peers.

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Active and Accessible Learning Environments Using DyKnow Vision

Introduction

Active learning describes various models of instruction that focus on giving ownership of the learning to the learner and encourages active presence during the experience. Students are guided by the professor, but encouraged to be cognitively present in order to benefit from the learning experience.

Johnstone et al. noted that multi-modal and "instructional approaches that accommodate are beneficial to students." The more ways the students can interact in the learning process, the better. When information is presented through several different channels, students are more likely to be successful.

"The well-designed instructional environment employs technologies that enable students to interact with the learning experience in ways that are relevant and enhance learning and can be accessed remotely" (Klenner-Moore, 2011, in press).

DyKnow

DyKnow Vision™ is an instructional teaching tool used by educators to encourage collaboration and active learning, both within and outside of the classroom setting. DyKnow Vision allows for student access after class hours to review the class lecture (audio recording capabilities) and class notes taken on the computer (real-time play-back features). This ability to review information on demand aids in retention and transfer of the learning.

DyKnow Vision provides an interface for interaction that incorporates note taking with writing and pen tools. The teacher is able to share PowerPoint slides, graphics, audio and web page links for students to review. The teacher creates a session in which students join and participate from their laptop, computer or notepad. These sessions and notebooks are stored on the DyKnow server for retrieval by students for review at any time.

When comparing DyKnow Vision to other software packages, Katie Hahn, Marketing Communications Coordinator for DyKnow, said the following, "As far as the collaborative-live functionality in DyKnow Vision goes, the closest "competitors" are Classroom Presenter and Ubiquitous Presenter. They have lot of the same interactive features but are much less robust than our Vision product. And, in relation to LMS and note-taking software like OneNote, we find that most of our schools use a combination of all three since each of these products offer distinct differences." (Hahn, 2011).

DyKnow and Students with Disabilities

DyKnow Vision is used with students with visual impairments at Appalachian State University in Boone, NC and King's College in Wilkes-Barre, PA. To assist students' impaired sight, professors use many tools to enlarge or speak the text of a lesson. DyKnow Vision can be effective for the student to enlarge the PowerPoint and lecture notes on his or her screen. Also, visually impaired students may have sensitivities to certain colors. This can be corrected using DyKnow's software on a student's personal tablet by adjusting backgrounds and fonts as necessary for visually impaired students (i.e. white letters on black background).

Despite all the benefits of the software in the active learning classroom for visually impaired students, there are some issues that need to be improved in order for the program to be fully accessible to this population of students. ZoomText, a magnifier used to enlarge what is on the computer screen, is not compatible with DyKnow Vision. The compatibility of this product with DyKnow Vision for students with only some vision loss is imperative. Also, DyKnow Vision and JAWS, a program that reads words on the screen aloud, are not compatible. For a student with full vision loss, it may be impossible to use DyKnow Vision without JAWS. We have found it helpful to have an assistant or other student work with the screen. The audio recordings are also helpful in this case.

DyKnow, Music, and Computers

DyKnow Vision is specifically used at Appalachian State University by Dr. Jennifer Snodgrass in the upper level Music Theory classroom to aid in teaching aural skills. Instructors can provide blank graphic paper for students, provide an aural excerpt, and students can dictate instantaneously using DyKnow Vision. Snodgrass, of Appalachian State University, says this feature is “very effective…in the theory classroom, I am able to see that the student has ownership of the material” (Snodgrass, 2011).

At King’s College DyKnow Vision is being used successfully in several computer and information systems classes. Students enjoyed having the ability to use the computer as a notebook and to share screens with scripts and lesson content. It has been somewhat difficult for the visually impaired student to use DyKnow Vision without the help of a guide.

Future Research

A closer look at using DyKnow Vision and active learning strategies in a classroom with a visually impaired student needs to be considered for both traditional and blended learning environments.

Conclusion

The hallmark of technology is to make the world easier to navigate and to learn. It is incumbent upon designers of technology for learning environments to begin by thinking about those learners who need to be able to participate in active and social learning experiences despite physical limitations. DyKnow is one tool that teachers can use to engage students with activity and give them ample opportunity to interact with the lessons outside of class time. Providing classroom tools that encourage and stimulate active learning is a requirement for successful learning environments.

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Regular Articles Section

Key Findings from a Survey of Student Perceptions of the Course Management System at the University of Florida

A recent course management system (CMS) evaluation committee at the University of Florida surveyed students to gather their perceptions of CMS tools and functions. The results of this survey are presented here to suggest some trends and issues institutions might consider when reviewing CMS options or other teaching and learning tools.

All UF students (N=52,000+) were invited to participate in the ten question survey, with 1,544 (2.97%) responding. Class ranks distributed fairly evenly though with a low response rate from professional students [Figure 1].

Class Rank		Count	%
Freshman		267	18%
Sophomore		227	16%
Junior		294	20%
Senior		283	20%
Graduate Student		291	20%
Professional Student		84	6%
Total		1,446	100%

Figure 1 – Class ranks of student respondents

Distribution of respondents by college [Figure 2] is self-explanatory. Dentistry, Law, and Veterinary Medicine probably had fewer responses because they do not currently use a CMS.

What is your college affiliation(s)?		Count	%
Agricultural and Life Sciences		166	11%
Business Administration		216	15%
Design, Construction and Planning		19	1%
Dentistry		1	0%
Education		58	4%
Engineering		222	15%
Fine Arts		28	2%
Health and Human Performance		58	4%
Journalism and Communications		81	6%
Law		6	0%
Liberal Arts and Sciences		451	31%
Medicine		11	1%
Nursing		44	3%
Pharmacy		111	8%
Public Health and Health Professions		55	4%
Veterinary Medicine		6	0%
Undeclared		33	2%

Figure 2 – College affiliation of respondent students

Respondents were 74% on-campus and 26% distance education. This distribution is not reflective of the actual population of the University, with distance education students being over-represented.

86% of respondents reported using a CMS and 14% reported no use. However, later open-ended responses suggest that many “non-users” had, in fact, used a CMS. Because the survey did not define or give examples of CMSs, uncertainty may have created confusion.

1140 respondents (92%) identified the system as very useful, useful, or somewhat useful [Figure 3]; further evidence for the importance of CMSs.

		Response	%
Very Useful		422	34%
Useful		488	39%
Somewhat Useful		230	19%
Neutral		31	3%
Somewhat Useless		38	3%
Useless		17	1%
Very Useless		11	1%
Total		1,237	100%

Figure 3 – How useful do you think the e-learning system is for your experience as a student?

Students were next asked to use a response matrix to indicate the most valuable CMS tools. Responses indicated that viewing grades, announcements, syllabus, assignments, assessments, discussions, and mail were the top choices [Figure 4]).

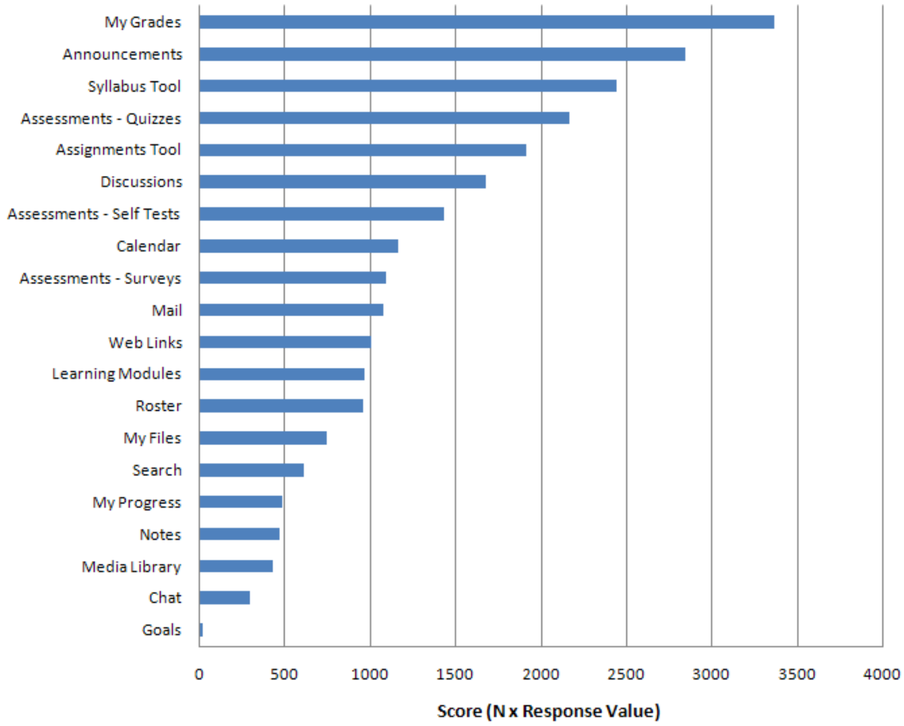

Figure 4 – Student valuation of features in the current UF CMS

To ask about new CMS features, students received a short list of tools under consideration for campus-wide adoption. As seen in Figure 5, file sharing and social bookmarking were most desired while portfolios and wikis scored low.

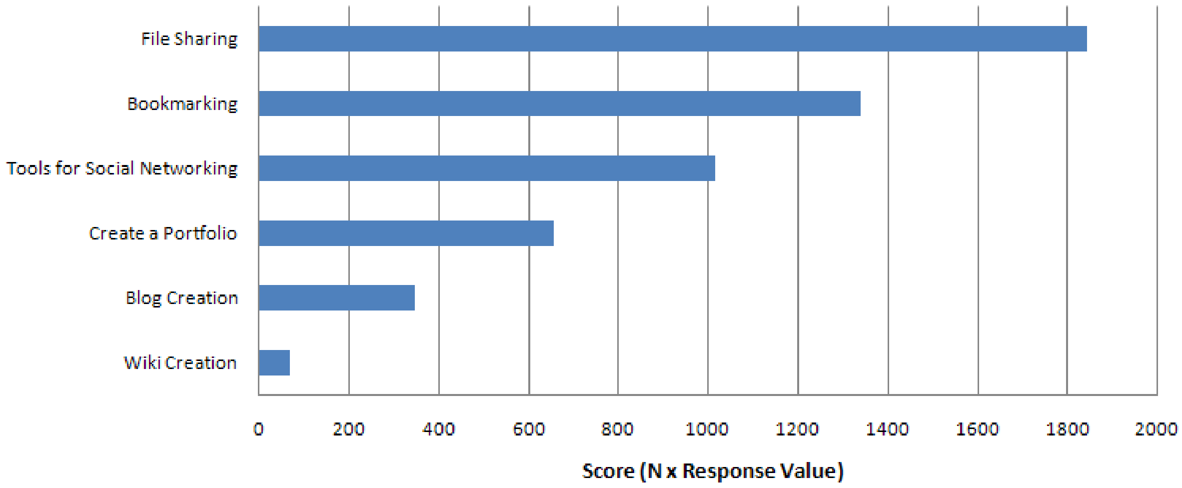

Figure 5 - Student responses regarding new tools in the future UF CMS

A final, open-ended question sought input about improving the CMS. Students most frequently cited the need for a better user interface. Some students also noted that instructors complain about systems being difficult to use and indicated that learning might be enhanced if the system was more "instructor-friendly," decreasing time required for assessment results and improving performance feedback. Students also desired better features in the email and in the calendar. Finally, a small number of students noted that future systems needed to be more compatible with Apple devices.

Response Analysis

Analyzing responses to the open ended questions provided additional insight. For example, while the "objective" questions did not ask about student perceptions of instructor CMS use, written responses indicated mixed student perceptions. Likewise, student responses document instructor perceptions that administration rarely values use of the CMS. Both insights have important implications for institutional support units and campus administration.

Running word analysis of the text responses elicited interesting themes. For example, when asked about improvements to the CMS, students familiar with CMSs wrote most frequently of "teachers," "tools," and "grades" [Figure 6].

Teachers	128		Email	50
Tools	97		Features	46
Grades	87		Discussions	39
Processes	74		Video	22
Exams	65			

Figure 6 - Commonly used terms in text responses of students claiming familiarity with course management systems

That "teachers" appears most frequently suggests that students are aware of teacher attitudes toward, and competence with the CMS. Comments also suggest that students want teachers to use the CMS; but they also want them to use it effectively.

Students who indicated no familiarity with CMSs were asked for recommendations, and used "system," "courses," and "computer" as their most common terms [Figure 7].

System	24		Students	12
Courses	17		Teachers	10
Computer	15		Work	9
Class	14		Access	8
Grades	14		File	8

Figure 7 - Commonly used terms in text responses of students claiming lack of familiarity with course management systems

It is interesting that students lacking familiarity with CMSs expressed concerns about the "system" – perhaps indicating anxiety about learning a new system. Likewise, it is notable that concerns about teachers drop while broader concerns about "courses," "computer," and "class" become top concerns.

Additional analysis indicated that responses generalized into three categories: 1) tools that empower self-monitoring, 2) enhance course-specific communication, and 3) provide information about the course [Figure 8]. That students seem to value most tools that empower self-monitoring has important implications for instructors given the broad impression that self-quizzes, practice tests, etc. are among the most under-utilized capabilities of CMSs.

Empower Self-Monitoring		715
Grades	385	
Assignments	96	
Assessments	234	
Course Specific Communication		463
Communication	395	
Discussion	68	
Information about course		129
Syllabus	35	
Announcements	94	

Figure 8 – Most valuable CMS tools as indicated by students

Conclusions

While we have not done a systematic evaluation of tool use in the University CMS, it is our impression that most courses limit themselves to presenting the syllabus, course files, and readings, and perhaps reporting grades to students. This study suggests that students want instructors to make more extensive and consistent use of available CMS tools for student progress monitoring (grades, progress indicators, self-assessments), for the "instant feedback" of online quizzing and testing, and for communication (mail, discussions).

At the same time however, the rapid growth in both hybrid and distance education raises many considerations that were not examined. For example, would on-campus and distance education students identify different preferences and priorities for tools? Future survey efforts might consider how to isolate these populations and compare how they rank tools and functions.

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Modelling an eLearning environment for learning programming languages

Introduction

It is widely accepted that solving programming exercises is fundamental to learn how to program. Nevertheless, solving exercises is only effective if students receive an assessment on their work. An exercise solved wrong will consolidate a false belief, and without feedback many students will not be able to overcome their difficulties. However, creating, managing and accessing a large number of exercises, covering all the points in the curricula of a programming course, in classes with large number of students, can be a daunting task without the appropriated tools working in unison. This involves a diversity of tools, from the environments where programs are coded, to automatic program evaluators providing feedback on the attempts of students, passing through the authoring, management and sequencing of programming exercises as learning objects. We believe that the integration of these tools will have a great impact in acquiring programming skills.

Our research objective is to manage and coordinate a network of eLearning systems where students can solve computer programming exercises. Networks of this kind include systems such as learning management systems (LMS), evaluation engines (EE), learning objects repositories (LOR) and exercise resolution environments (ERE).

Our strategy to achieve the interoperability among these tools is based on a shared definition of programming exercise as a Learning Object (LO).

Programming Exercises as Learning Objects

The concept of Learning Object (LO) is crucial for the standardization on eLearning [1]. The latest standard for LOs is the IMS Common Cartridge (IMS CC) [2]. An IMS CC learning 2object assembles resources and metadata described by a manifest. We developed an XML dialect called *PExIL*, standing for *Programming Exercises Interoperability Language*. The aim of PExIL is to consolidate in a single document all the data required in the programming exercise life-cycle, from when it is created to when it is graded, covering also the resolution, the evaluation and the feedback. PExIL documents can be used for authoring LOs containing programming exercises.

The generation of an LO is based on a valid PExIL instance as depicted in Figure 1. The Generator tool uses as input a solution file and produces automatically several resources (e.g. exercise description, test cases and feedback files) described by a valid IMS CC manifest and wrapped up inside a ZIP file.

Nevertheless, the impact of PExIL is not confined to authoring since these documents are included in the LO itself and they contain data that can be used in its life-cycle, to present the exercise description in different formats, to regenerate test cases or even to produce feedback to the student.

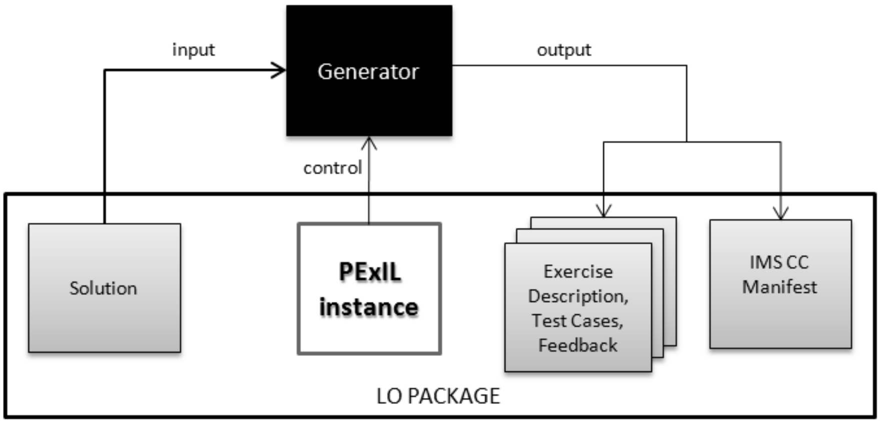

Figure 1 – Structure of a programming exercise as a LO

Environment for learning programming languages

The previous LO definition will be used in a learning process regarding the automatic evaluation of programming exercises. The evaluation of programming exercises involves the following types of services:

- Learning Management System - to manage and retrieve the exercises to the learners. We chose the Moodle LMS since it is a free and open-source LMS with a significant share on the LMS market [3];

- Learning Objects Repository - to persist LOs and related meta-information. We developed a specialized repository named crimsonHex [4] which currently stores more than 2000 programming exercises;

- Evaluation engine - to evaluate and produce feedback on the learners' attempts to solve the exercise. We will use the Mooshak system as the evaluation engine based on a shared service [5];

- Exercises Resolution Environment – to code the attempts of solving an exercise. We will use the Eclipse IDE since it is a free, widely used and open-source solution.

Figure 2 shows the integration of these services in a pedagogical learning process. In this particular scenario the teacher starts by setting a number of activities in the LMS, including the resolution of programming exercises. To select the relevant programming exercises the teacher 1) searches for relevant exercises in the repository. Then, the learner 2) tries to solve the exercises set be the teacher using an Experimentation Environment (e.g. Eclipse IDE). The IDE 3) recovers exercises descriptions from the repository showing them to the student. After coding the program the learner 4) send an attempt to the Evaluation Engine. The Evaluation Engine 5) recovers test cases from the repository. The learner may submit repeatedly, integrating the feedback received from the Evaluation Engine. In the end, the Evaluation Engine 6) sends a grade to the LMS that records it and reports the LO usage data back to the repository.

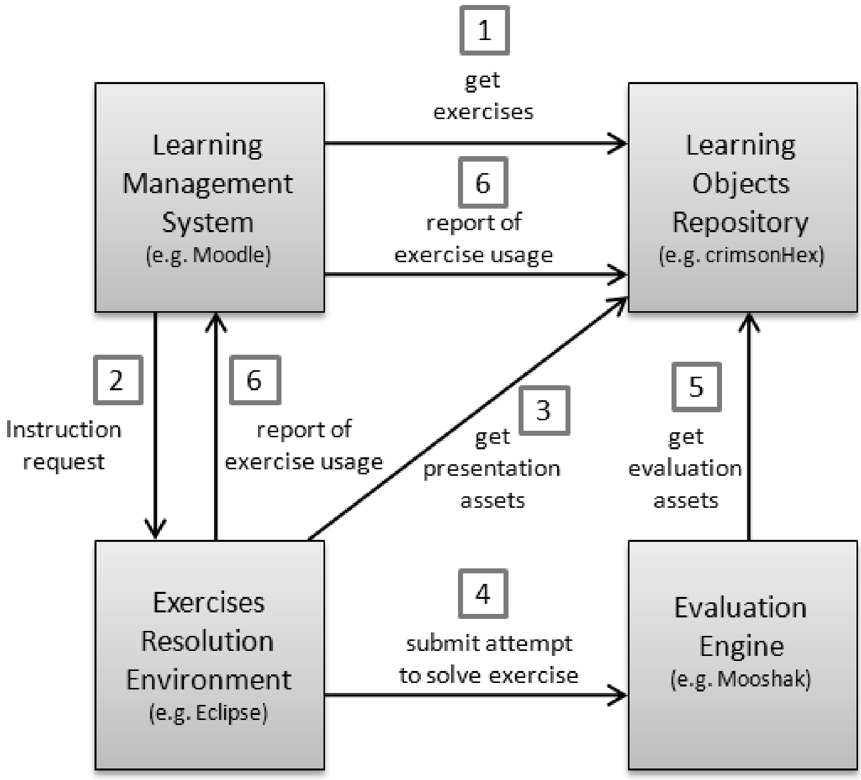

Figure 2 – Service integration in a pedagogical learning process [4]

Future Work

We are currently finishing the development of the generator engine to produce a LO compliant with the IMS CC specification. The generator uses the PExIL definition to produce a set of resources related with a programming exercise such as exercise descriptions in multiple languages, input and output test files, feedback and a manifest file used to describe the programming exercise as a whole. This tool could be used as an IDE plug-in or through command line based on a valid PExIL instance.

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The Technological and Pedagogical Aspects of Developing and Operationalizing an Online Media Production Course

Introduction

As the field of distance education advances, the boundaries between which types of curricular content can and cannot be taught online is blurring. Advancements in educational technology and internet access are allowing en mass delivery of digital instruction to take place. In this article the authors describe the process and challenges experienced while approaching and surpassing what once stood as a technological and pedagogical barrier in distance education course offerings. The innovations in course conception and learning dynamics that made it possible to successfully design and offer an online multimedia production course are discussed.

Background

When first faced with the challenge of developing an online media production course in order to meet a need in department curriculum, the course type and primary production methods were identified by various research sources. According to Start, Piwinsky and Lamberski (2010) photography has been identified as the production course which is seen as most favorable by university students to be offered online in the future. In addition, Sadik (2008) discusses a multimedia production process involving still photographs and audio to create digital stories. The development of this course follows the need identified by Start, et al. (2010) and a production format which is similar to that identified and implemented by Sadik (2008). Thus, a multimedia format for the delivery of a documentary photography course was chosen. The constructivist approach of learning being viewed as a process of instructor facilitation rather than direct knowledge conduction (Savery & Duffy, 1996) was chosen as the primary theoretical framework for the course.

Course Design

The course was primarily designed to provide the student with information, instruction and an obstacle/project within each major section. Students would create digital stories by means of taking their own documentary photographs along with music, captions, video effects, transitional effects and creative license and create three to five minute video clips in the given software package. Theoretical, historical and practical information along with guidelines, tutorials and examples were presented to the students through the learning management system (LMS). Within this stepped process, the learners were then presented with an obstacle/project that took the form of a documentary photography assignment where they would have to apply the unit specific instruction and tools in order to complete the tasks at hand. These pedagogical methods may be somewhat usual; however the greater challenge and need for innovation came with meshing the basic instructional principles with the technological needs inherent in the curriculum. The primary LMS used was Moodle. However, the University Project Directory information management system (IMS) was required to manage and upload the large video files in excess of 50-100+ MB. Students would then work back and forth between the LMS and IMS to fulfill various course functions. The LMS was utilized for dissemination of content and instructor feedback while the IMS was used for students to turn in their assignments to the instructor for evaluation.

Implementation

On paper, the instructional and technological strategy was sound and approved; however when it was piloted during the first offering of the online course, various unexpected needs and issues arose. Levels of familiarity with the IMS and LMS were overestimated by course designers and remedial instruction along with an unforeseen high volume of clarifications had to be delivered to some of the students in order to approach content mastery. However, after the initial confusion, the course began to run as intended and the majority of students were able to master the technological aspects of the course and focus on documentary photography content. This fact is noteworthy. However, the required synergy between IMS and LMS was never realized by some of the students who struggled with the basic technology involved with online learning for the duration of the semester. It then came to the authors' attention that for some students the course unintentionally became a vehicle to teach the technology. This became more of the focus for the course, almost forcing the primary documentary photography content aspects to become secondary. In such cases, bridging the gap between the technology as a delivery system and the actual course content became the central concern for the instructors involved.

Discussion and Conclusion

The question remains: Can teaching media production courses through a distance education model be effective? Information gained from the implementation of this pilot online offering can only suggest a direction for this type of pedagogy. Student results from this experiment would indicate that online delivery of production courses is not only plausible, but often desirable from the vantage point of some students. The technology of delivery has been shown to work if the students commit to the process. If they do not, then the students tend to meet insurmountable obstacles to their success, not only facing difficulty mastering the aesthetic and theory-bound content but also the technological skills needed to actually perform the required tasks online. Initially entering into this arena may not be for the fainthearted, but the rewards of such an experience may help enhance and refine the quality of educational curricula in the 21st century.

Acknowledgements

Special thanks to Ms. Jennifer Tissue for assistance with proofreading and formatting.

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