Online Education: An Instructor's Perspective

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ABSTRACT

Higher learning institutions are adopting online education more and more as they try to meet the expectations of the digital era. Learning institutions are driven externally and internally to be more agile in academic offerings with regard to delivery. The paper investigates the past and current status of online education offered by higher learning institutions in the USA. In addition, the paper offers some experiences of the author in teaching online classes.

Keywords: Online learning

1. DEFINING ONLINE EDUCATION

E-learning comprises all forms of electronically supported learning. E-learning as a wider concept, which is known also as Computer-Based Learning/Training (CBL/CBT), Internet-Based Learning/Training (IBL/IBT), Web-Based Learning/Training (WBL/WBT), Learning Management Systems (LMS) and E-learning encompasses all computer and network based technologies used to transfer knowledge and/or teach specific skills (Cook, 2005; Graziadei, 1997). Online education is an element of E-learning.

Higher learning institutions in North America and especially Europe evolved over centuries while preserving their core administrative and academic frameworks (Gapinski, 2010). With the advent of online education, for the first time they are facing socioeconomic challenges which will force them to undergo more dramatic changes than in centuries past.

2. ONLINE EDUCATION: WHERE ARE WE COMING FROM?

While using computers in teaching (CBT) started in the 1960s – Stanford University psychology professors Patrick Suppes and Richard C. Atkinson taught math and reading to young children in elementary schools in East Palo Alto, California – the adoption of online learning/teaching occurred much later with the advent of computer networks. Graziadei, et al. (Graziadei, 1997) proposed an overall strategy for the development and management of technology-based course within CBL, which extends naturally to online education. Technology offerings in the realm of new ways of learning must be easy to maintain, portable, replicable, scalable, and cost effective.

In 2006, over 3.5 million students took online classes at higher learning institutions in the United States. As reported by Sloan Consortium, there has been a steady increase of around 12-14 percent per year on average in enrollments for fully online learning over the 2004-2009 years in US post-secondary education. For-profit educational institutions started to use online instructions much more intensively than non-profit institutions (Sloan Consortium).

Speaking more broadly with respect to educational systems, pedagogical researchers and practitioners were hoping that new technology would bring improvement to learning outcomes especially in the realm of teaching specific skills to students based on individualized instructions (Bishop, 1971). Furthermore, multisensory learning

facilitated by new technologies created opportunity, in the eyes of proponents, to tailor educational experience to address at risk students (Mendrinos, 1997). There are successes in these areas, where a variety of technologies are employed to target specific audiences such as teaching technical skills in training education, languages, certificate programs, etc.

Recent years brought virtual classrooms, class management systems, and social networks. Educational institutions offer blended formats of class delivery where computer based activities are integrated with traditional classroom environment.

Pedagogical research suggests that effective learning/teaching environment takes into account the learning styles of the audience. Next, we will look at learning styles and consider how e-learning may be tailored to individual expectations.

3. LEARNING STYLES AND ONLINE LEARNING

It has been identified and known for quite some time that the learning and teaching processes can be more effective if learning styles and even personality characteristics of the targeted audience are taken into account. Kolb (Kolb Learning Styles, 1984) in 1984 published his learning styles model and experiential learning theory, which described pivotal concepts of understanding and explaining human learning behavior. According to his model learning can be expressed as a four stage process:

- "Concrete Experience (feeling)
- Reflective Observation (watching),
- Abstract Conceptualization/Assimilation (thinking)
- Active Experimentation (doing)".

Learning styles (Kolb, 1984) can be characterized as:

- "Diverging (looking from different perspectives, sensitive, watch rather than do, idea generation, work better in groups)
- Assimilating (concise & logical approach, prefer theories than practical aspects, less focus on people than ideas)
- Converging (solve problems & find solutions, technical tasks/abilities, practical applications)
- Accommodating (Hands-on, practical/experiential approach, gut instinct rather than logical analysis, rely on others, action & initiative, work in teams, target/goal setting)."

Furthermore, limiting attention to audio-visual-kinesthetic modalities, some classify learning styles, after (learning-style), as:

- "Visual Learners (respond to visual stimuli the best - benefit from illustrations and presentations that use color, are attracted to written or spoken language rich in imagery, prefer stimuli to be isolated from auditory and kinesthetic distraction, find passive surroundings ideal)
- Auditory Learners (respond to audio stimuli the best - acquire knowledge by reading aloud, remember by verbalizing lessons to themselves, etc.)
- Kinesthetic Learners (active, hands-on, realization through doing & physical activity)."

Online education should take advantage of the fact that it lends itself to some learning styles more effectively than to others. These learning styles are based on: a non-linear or non-systematic approach to building knowledge, preference of computer-mediated environment over face-to-face interaction by introverted students, active learning in which recipients take more responsibility for their own progress (www.education.com), and visual and kinesthetic styles of learning.

From the author's observation while teaching various statistics and engineering classes in online and hybrid or blended format, online education requires a higher level of academic maturity, more self-reliance, openness for new methods of learning, and better time management skills from participating students in comparison to traditional classroom environments. Also, students who register for online classes seem to presume that classes will require more independent work on their part.

According to Survey of Student Engagement (Lipka, 2011), NSSE, online students report greater use of different learning strategies, which would confirm author's observations about learning methods used by students in online courses.

Over the past thirty years computer based learning has continued to evolve and now offers group and truly individually tailored approaches to learning building on individual learning styles. With organizations like Khan Academy, courses can be supplemented with individualized lessons which students and instructors can check on their own time outside of the time specified for lectures. Opponents argue that online education restricts human-to-human interaction and, thus, limits the educational experience. Both sides have valid arguments.

In my experience, online learning allows for more flexibility in the learning experience. This can be a double-edged sword. For more academically mature students this is a positive as they are better able to balance all their responsibilities. However, for the less academically mature students a more structured approach works better. In addition, some subjects lend themselves more readily adaptable to new methods of delivery, such as abstract, quantitative subjects. On the other hand, subjects qualitative in nature need the human-to-human communication of the standard class format in order to provide the full verbal and non-verbal context when communicating. For example, a poem read by the author sounds different than a poem read off a dim laptop screen.

Empirical and research data are still inconclusive in most part about definite advantages or disadvantages of standard vis-à-vis online education. Both methods of course delivery have their own advantages and will co-exist to serve their respective audiences in complementary ways. Definitely, pedagogical research has to perform more empirical studies to find more definite answers.

4. IS PERCEPTION OF ONLINE LEARNING/TEACHING IMPORTANT TO OVERALL SUCCESS?

Schell (Schell, 2001) investigated students' perceptions of web-based course post factum, trying to assess if a web based course is better than a traditional offering with regard to amount of work and learning. His findings were not conclusive: thirty three percent of respondents felt strongly that they put more work into online class, while thirty six percent felt strongly that they learned more in the traditionally taught course. Time convenience was more important than distance convenience for students.
Is perception an important factor in effectiveness of online education? Recent reported findings claim a positive answer to this question (Schell, 2001). According to findings, positive perceptions of learning online are essential to student success. As a consequence of this finding, researchers investigated practices that enhance perceptions.
There are a number of identified factors that enhance student perception of online learning. A noted factor is experience with websites outside of the classroom to become familiar with their use and develop a trust in the information provided, such as online course registration, online database research, etc. Secondly, creating an environment that nurtures intellectually curiosity not only in the classroom, but online as well. Thirdly, early engagement of students prior to starting class as well as at the beginning of the semester. (Schell, 2001)

In a broader view, research suggests that evidence-based practice increases success in online learning. Early pro-active engagement of students, flexibility of scheduling, and an effective faculty are factors that increase student and faculty success in online learning. (JALN)

5. TEACHING STATISTICS AND ENGINEERING CLASSES ONLINE – AUTHOR'S PERSPECTIVE

The author taught online introductory statistics classes for non-math major students online and engineering technology classes using a blended or hybrid format. The blended or hybrid format engineering technology classes consisted of half the lecture delivered online using Adobe Connect conferencing tool, Breeze (AdobeConnect) and the other half the lecture delivered in a standard campus setting. The laboratory component was taught at campus facilities as in a regular lab course.

The class management system used Penn State University was Angel (see Figure 1 & 2). Although in the late 1990s, the author used authoring software such as Adobe Authorware among others to develop CBT instructional material for course management prior to Angel (Authorware; Gapinski, 1998).

The key to success of teaching online is preparation ("preparing the soil" (Shelton & Saltsman, 2004)). To achieve this, students were encouraged to participate in online activities, such as familiarizing themselves with the basic requirements of online learning available at Penn State University's website (http://istudy.psu.edu/) (istudy.psu.edu):

- Study skills: note taking, active reading, time management, problem solving, etc.
- Academic integrity including plagiarism
- "Learning Online – Are you ready?" The objective of the provided material is to:
  - Determine student readiness for taking online courses.
  - Develop the required competency and skills to succeed in an online learning environment.
  - Identify available resources to help student self-paced learning.
  - Understand appropriate etiquette for online communication.

Synchronous lecture and discussions were conducted via Adobe web-based conferencing software, Adobe Connect, Breeze (Adobe). Lecture times were determined jointly with students. Naturally, the selection of the lecture time was not an easy task by any means. After each online session, the author provided copies of the Whiteboard screens discussed for easy asynchronous retrieval by students at later times at the class website accessible through Angel.

As far as details of the method of delivery is concerned, the author used the Adobe screen "pods" limited to a Whiteboard and bi-directional Chat-text Box pod (see Figure 3).
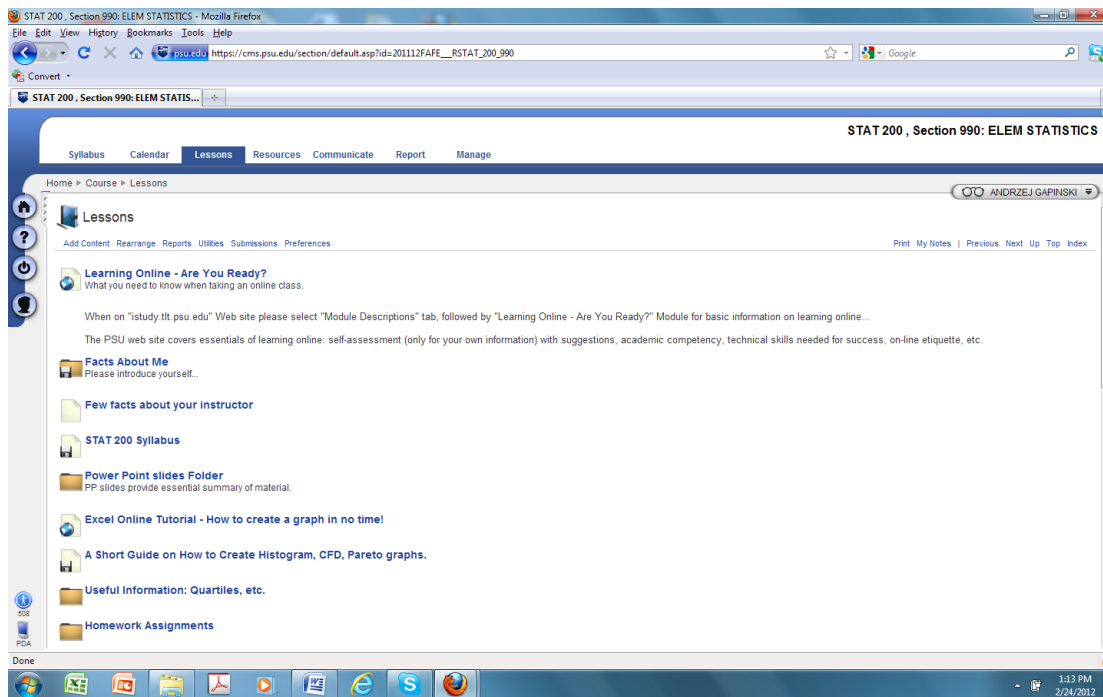

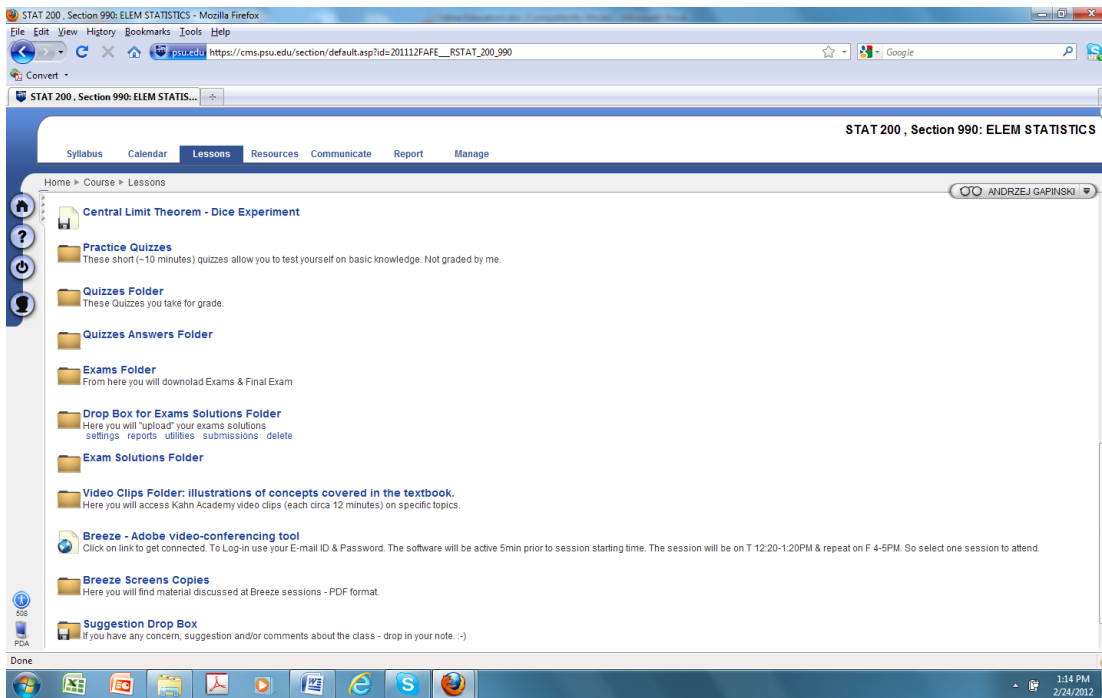**Figure 1: PSU Class Management System. Angel. Course Web-site**.

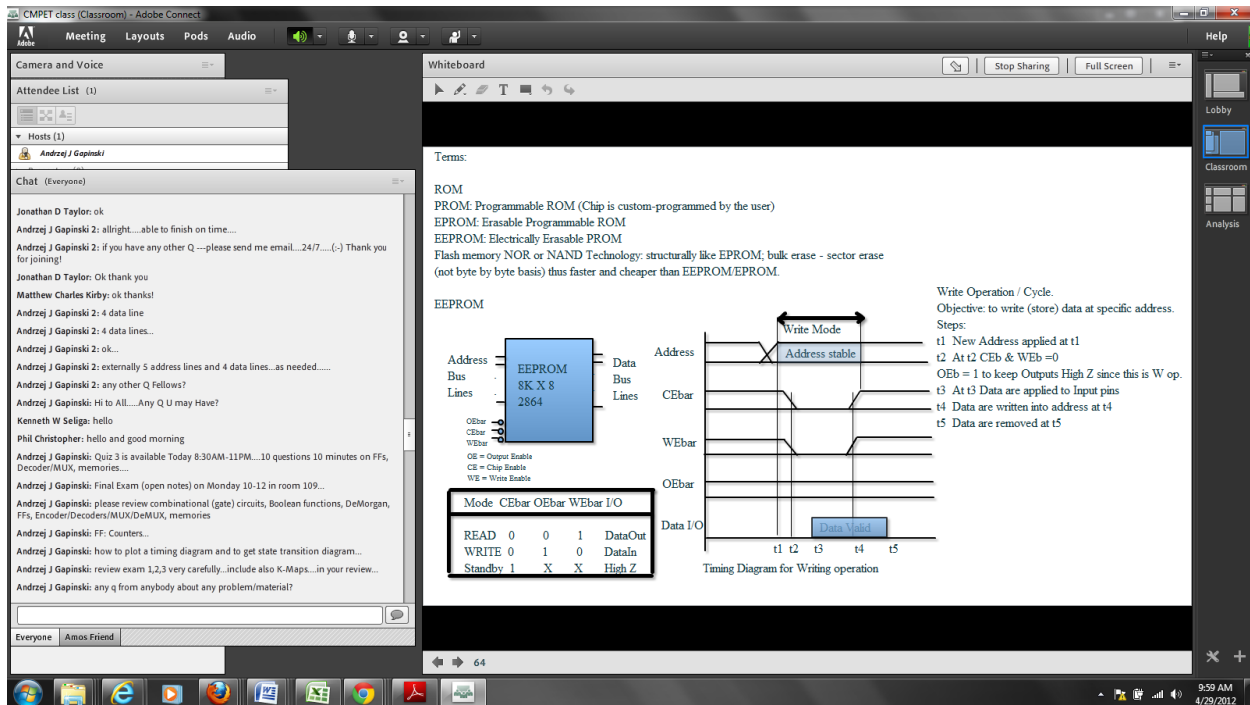**Figure 2: PSU Class Management System. Angel. Course Web-site.**

Figure 3: PSU Class Management System. Adobe Connect. Breeze. Chat Box and Whiteboard.

During the lecture/discussion sessions, the students had access to the chat-text pod and small icons called "emoticons" to respond to questions using text or affirmative or negative icons, etc. Since the number of students was usually above ten, the author did not use the voice feature to conduct class. Often, the audio option offered delayed voice communication, which made the session hardly smooth or easy to follow.

In statistics class, which was delivered completely online, the author provided a link on the class web site to a library of video clips available on the Khan Academy website (KhanAcademy. Khan Academy sponsored among others by the Gates Foundation, is a nonprofit educational organization, which provides educational instructional video clips on a variety of subjects including, math, statistics, probability, etc. The author incorporated online activities such as participation in online lectures/sessions, viewing recommended material including instructional video clips on discussed subjects as part of the class grade. The university class management software allowed for access tracking including information on students' log-in times and duration of viewing by students. Quizzes and exams were administered online.

The major attraction of the online statistics class for non-math major students was flexible time and non-campus delivery features, which was particularly important for nontraditional, older students. Many students dropped out in statistics class – due to, in the author's belief, of the initial misconception about a lower academic rigor for online class in comparison to a traditional class.

The engineering technology courses were delivered in a hybrid format. The specific classes were Digital Electronics and Semiconductor Devices. Half of the lecture component was delivered in a standard classroom format at a campus location while the other half took place online. As one may expect, the lecture time selection and mutual availability was a difficult logistical issue. As math skills of engineering students were much better than those of the general population of students, it does not come as a surprise that the performance and success rate with the online class component were much higher than in the statistics class.

As in traditional classes, extracurricular activities such as work, family, sports, etc. affected the performance of students in wholly online as well as hybrid classes.

5.1 ENGINEERING/TECHNOLOGY: LAB ONLINE? – NOT SO FAST!

Engineering and engineering technology education in recent years have been exploring offering laboratory courses either fully online or in a hybrid format using tools such as the National Instruments LABView (www.ni.com.Labview) software and hardware. The schools that offer the online laboratory courses are few and results about viability are not yet conclusive. Established engineering programs are somewhat reluctant to go online with laboratory activity where instilling professional skills including team-based problem solving is crucial to meeting programs objectives and ultimately accreditation (Bekhouche, 2011).

6. ORGANIZATIONAL IMPACT OF ONLINE LEARNING

Initially, it seems that non-profit higher learning institutions were considering online education as inferior to "brick and mortar" standard campus instructions, but market forces and expectations from students for much more flexibility in delivery methods forced non-profit higher learning institutions to change that perception.

To meet student needs and/or internal organizational demands of greater efficiencies, higher learning institutions began to offer online education. For-profit organizations started to offer online classes much earlier than non-profit higher education, and in many instances this is the only method of class delivery for them. To be true, without "brick and mortar" infrastructure in many instances, it was the only way to provide their educational services. Graduate level courses are now being offered online in many leading research institutions.

The new ways of course delivery affect higher learning institutions themselves. The scope and extent of the change is constrained by university cultures and existing capabilities as noted by research from five universities from the USA, the United Kingdom, Australia and New Zealand. In instances where universities are implementing online education, strong leadership is needed. Otherwise, online education and its technologies are simply used as vehicles to implement changes previously planned or intended. (Marshall, 2011)

A recent report from 2011 (Kauffman, 2012) shows that recent graduates have less professionalism than five years ago with respect to: interpersonal skills, lack of focus on task at hand, IT misuse, etc. This is due to the increased use of digital methods of communication such as texting, email, Facebook, Twitter, etc. Institutions of higher learning must be careful to provide the right balance between the use of technology in class delivery and instilling strong interpersonal communication and professionalism.

There are new initiatives in online education such as Udacity, a for-profit startup setup by Mr. Thrun that specializes in Massive Open Online Courses or MOOC. Udacity and similar initiatives may deliver real "democratization" of higher education by offering access to state of the art topical knowledge via free online courses. Udacity plans to monetize their students' skills by getting their permissions to sell leads to recruiters rather than charging tuition. (Lewin, 2012)

Ultimately, in online learning as in any type of learning a student is responsible for his/her educational success. Persistence, staying motivated, good time management and study skills separate successful from failing students in online education. Therefore, it is vital to prepare students for successfully passing online classes by providing information about expectations regarding study skills, time management, academic self-reliance, and self-discipline prior to starting courses online.

7. CONCLUSION

It is expected that higher learning institutions will continue to offer more online classes in either the full or hybrid format. Naturally, some subjects lend themselves more readily adaptable to new methods of delivery, such as abstract, quantitative subjects. Over the past thirty years computer based learning has evolved to a level which allows tailoring to the individual level. With organizations like Khan Academy, courses can be supplemented with individualized lessons which students and instructors can check on their own time outside of the time specified for lectures. This reliance on computer technology is what opponents dislike. Opponents argue that online education restricts human-to-human interaction and, thus, limits the educational experience. Both sides have valid arguments.

In my experience with engineering and statistics courses, online learning allows for more flexibility in personalizing the learning experience. This can be a double-edged sword. For more academically mature students this is a positive as they are better able to balance all their responsibilities learning on their own pace and with the tools that work best for them. However, for the less academically mature students a more structured approach works better such as the traditional classroom environment.

Empirical and research data are still inconclusive in most part about definite advantages or disadvantages of standard vis-à-vis online education. Definitely, pedagogical research has to perform more empirical studies to find more definite answers.

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