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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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Editorial

Data! Data! Data!

Donald Perrin

In a 1992 seminar led by Edward Deming, I questioned the value of *Teacher of the Year* awards. The concept so annoyed Dr. Deming that he rose from his wheelchair and said such awards are mere popularity contests. “You won’t know how effective the teaching was for another five years.” Good decisions require focused questions and lots of relevant data – “Data! Data! Data!”

This raises questions about evaluation beyond those raised in earlier editorials and journal articles in that dealt with objective vs. subjective, performance vs. knowledge, rubrics vs. standardized tests, and criterion-based measures vs. grading on a curve. The products of education are realized in the future. Only then will we truly know if learning experiences were relevant, effective, and productive in the development of the learner for his/her future life and career.

I projected these same questions into real world decisions in business, government, pure and applied research, cost-effective use resources and accountability. In the sixties and seventies I read and evaluated federal education programs for learners with disabilities. The reviewers were well versed in evaluation techniques such as the Stufflebeam’s CIPP (Context, Input, Process, Product) evaluation model that provides data from actual experience rather than costly and time-consuming statistical studies. In those days, we argued theory-into-practice issues with industry and academic leaders such as Robert Diamond and Egon Guba as served on advisory committees for new and existing educational services and programs.

On one occasion we were evaluating project proposals for funding up to \$100,000. A proposal from Ray Kurzweil, a person unknown to our team members, requested \$250,000 to complete development and initiate distribution of reading machines for deaf students in US universities and colleges. Based on the documentation provided, we recommended full funding with the hope that this significant technology might be available in one to two years. It was approved. Within three or four months there was a steady trickle of Kurzweil Reading devices, one for each university or college library. It was an excellent machine and a huge success making the entire library accessible to blind students.

Looking backward, The evaluation techniques we used were shoddy by today’s standards. We did not know that Ray Kurzweil was to be the leader in a new industry. He invented the flat-bed scanner, the optical character reader, text to speech software, and the first really practical reading machine. He would continue to innovate throughout his career with speech recognition, music systems to synthesize orchestral performances from sheet music, and devices to accelerate performance through artificial intelligence. Ray Kurzweil continues to be internationally acclaimed for his inventions. We did not – and could not – anticipate the quality and success of the Kurzweil Reader.

Some of the other projects we funded were not so successful. People with great ideas do not always have the ability to implement them. From the evaluator’s point of view, decisions about the future based on new and not-yet-known technologies present considerable risk. Today we have better tools for research, decision making, and risk management. The question is: do these adequately support the genius of a successful entrepreneur or can they become tools for exclusion? Can public education find and adopt technologies that will stimulate learning and develop curricula that will prove relevant, effective, and productive in the future? How will this transformation come about?

Editor's Note: Relating perception theory and practice to learning provides additional keys to effective design of web-based lessons. This research provides specific data on English and Turkish websites for consideration by the reader.

An Evaluation of Educational Web-Sites from the Perspective of Perception-Oriented Design Principles

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Turkey

Abstract

The research was conducted in two steps by means of evaluating educational websites as to visual perception theories. The first step involved developing an evaluation form in concert with designated visual perception theories. These theories are namely as; Gestalt Theory, Brunswik's Probabilistic Functionalism, Marr's Computational Model of Vision, Neuropsychological Theory, Constructivist Visual Perception Theory, Theory of Direct Perception and Ecological Optics. The second step involved assessments of websites with educational contents by the use of that evaluation form. The second step saw the analysis of 10 educational websites for primary school level, with the use of "Web based Evaluation Form for Educational Contexts", 5 of which were developed in Turkish and another 5 in English. Assessment of the websites was carried out with the participation of 16 field experts. Research exposed that analyzed websites had major deficiencies in terms of their conformity to design principles. However, English websites received higher scores from design principles as compared to Turkish sites. The research yielded some critical conclusions through assessment of design principles employed up in the analyzed websites as to selected dimensions, i.e. page layout, color, typography, visuals, animated graphics, navigation and browsing, and content and functionality.

Keywords: perception, visual perception, web design, theories of visual perception.

Introduction

We acquire all knowledge pertaining to events, phenomena and concepts through perceptions. Perceptions are created through sensations and they are basically processes of knowledge attainment. Perceptual process is composed of sensing and recognizing of a stimulus (Demirel and Ün, 1987). It is about the actual environment that literally surrounds the individual and the virtual environment that is called the "socio-cultural environment" formed by information coming from the past and new supplementary information continuously added thereupon (Erinç, 1998). The interplays between the two environments and their manipulations by the individual is what causes perception to take place.

Despite being a widely used concept, primarily in psychology and educational sciences and to a lesser degree in many different others, visual perception lacks a strong research and theoretical ground. Visual perception is the sensory awareness of a perceived concept and selecting, organizing and describing of each particular stimuli holistically as parts of that concept by means of understanding its visual features (Behrens, 1984). Individuals demonstrate certain selectivity through perceptual process. At this point, personal interests, attention and characteristics play a critical role.

The quality of the content, which is intended to create a specific visually attained perception, as well as developing a successful transmission system with an effective message system, eventually enhances the quality of educational designwork. If the visual perception research is to be based on target community's characteristics, then it may allow the receptor to better use the design since it

would resolve the perception-related questions. During the design process, utilizing most significant features of concepts, objects or events, which are intended to create perception, as access points is vital for effectiveness in perception (Smeulders, Worring, Santini, Gupta and Jain, 2000). Perceptions pertaining to visuals are determined by a set of factors. These are visual features that can be placed in three groups, i.e. color, texture and shape, and motion (Eidenberger, 2004).

Quality features related to perception and specifically visual perception have to be considered in many design settings, with a particular emphasis in educational settings and design work. Perceptual characteristics may vary among the individuals, nevertheless from a broader view it can also be suggested that perception has several requirements.

Visual perception determines many design settings and quality aspects, especially for those that are visual content-intensive. One of those environments is educational design. Quality of educational design work is commensurate with how much it meets the perceptual expectations of the target community. In this juncture, the matter of how educational designs' perceptual quality is produced and developed gains a special importance. In educational design, especially the very issue of what type of qualities it has to possess and how much it conforms to perceptual criteria is highly neglected albeit for a few fundamental design principles. Focusing on perception's cognitive structure and its reflections on process of educational design is in fact fundamentally essential to produce high quality educational designs.

Theories of Visual Perception and Design Principles

The visual perception theories chosen to develop an evaluation form to assess the educational websites are ones that have been picked up from the perspective of available theories that are can make a direct impact on developing a new design in perceptual process. These theories are: Gestalt Theory, Brunswik's Probablistic Functionalism, Marr's Computational Model of Vision, Neuropsychological Theory, Constructivist visual perception theory, and Theory of Direct Perception and Ecological Optics.

Gestalt has been the first of general approaches to perception. It has left a substantial mark on perceptual psychology and it is referred to by a large number of researchers. The Gestalt approach is distinguished with principles of figure-ground relationship, proximity, continuity, similarity and closure. The Probabilistic Functionalism approach, based on the work of Egon Brunswik (1903-1955), advocates that perception of objects depends on intrinsic characteristics of those very objects, the physical context the objects are in, the intermediary between the object and the perceiver, the perceiver him/herself and his/her own characteristics. According to Marr's Computational Approach, perception can be explained by such context whereof it takes place, and integrating, interlinking and reinterpreting of features pertaining to the perceived concept (Gordon, 2004).

As the Neuropsychological approach constitutes the basis of the "Information Processing Model", which has a considerable presence in Cognitive Psychology. This suggests that humans' cognitive activities are made up of 4 parts, i.e. planning, attention, simultaneous and consecutive cognitive processing. Constructivist Visual Perception approach based on the work of Richard L. Gregory, which he produced during 1980s, advocates that such distinct personal characteristics as preliminary information and spatial skills play a key role in visual perception. However, Gibson's Direct Perception approach is built upon ecological analysis of perceptual problems. Thus, this approach claims that perception happens directly. This is because perception is not a process of indirect inference and sensations are not constructed by sensory organs (Gordon, 2004). Nevertheless, yje Direct Perception approach fails to provide a profound explanation for illusions.

Literature Review

A search through the literature regarding visual perception approaches employed by educational websites and their evaluation, according to design principles obtained, reveal that very little scientific work is to be found. Evaluation of educational websites is an area where little work is conducted and published (Boklaschuk & Caisse, 2001). Yet, most of those works are not geared towards evaluating websites' visual design principles alone but rather evaluating them from various perspectives.

Another research by Ivory and Hearst (2002) was carried out with the intention to conduct a quantitative rating of informational, graphical and navigational features of those websites; and the outputs of such research was supposed to help non-professional web-designers advance their skills to a competent level. By the very end of the research, indicators, such as text components, graphic components, hyperlink components, text format, graphic format and hyperlink format, were identified in order to rate quality and user-friendliness of the websites designs. For every indicator, different corresponding explanations were made to show what they mean and different corresponding gauging rules were identified.

In one of research in which Taverna (2003) attempted to evaluate website design and functionality, he collected feedback from 11 participants. Participating students were asked to rate website components regarding their repetition, refresh, adjustment and closure features. At the end of the research, it was found that there were more negative comments associated with color and contrast features than the others. A research carried out by Boklaschuk & Caisse (2001) tried to identify the different applicable criteria that enable evaluation of content and technical aspects of online educational resources. They were experienced difficulties due to a misconception that the necessary indicators were not in place to evaluate educational websites. Research set out the aesthetical, visual attractiveness, navigational and accessibility criteria. It also set out criteria for accountability, truthfulness, objectivity, scope and validity. The research report included an example of the evaluation tool and evaluation of chat sessions.

Adojaan and Sarapuu (2000) suggested a scale for educational websites when they were working out on the criteria to be referred to while developing effective educational websites during one of their researches. The used 5-point Likert-type scale consisted of 48 questions. These sections were about websites' composition, general educational value and its position as compared to the curriculum. The scale's convenience was tested in comparison of three different educational sources. The scale can be accessed in template form from <http://www.eformular.com/scale/scale.html> as it is also open to be developed by everyone.

Dursun (2004) analyzed the conformity of educational websites to the criteria listed in Web Design Scale. The study showed that the Websites meet the visual design criteria with a ratio of 55%. Erişti (2005) carried out a research with the participation of 18 primary school students in which interactive educational CDs, developed as per the graphic design principles, were examined to reveal their effectiveness in elementary art staff education. Based on the research results, it was concluded that interactive CDs ensure a lasting learning for the students. In addition to this, students expressed positive remarks about the prepared material.

At another research conducted by Cengizhan and Ates (2006), visual design's written and figure elements were analyzed; and principles to be applied to these elements were identified. Visual objects were shown to the Computer Education and Instructional Technology Department students and they asked to comment on the principles used to develop those objects. From the research results, it can be deduced that learners are familiar with the visual design elements and they are knowledgeable about them at the level of practice.

Yigit, Butuner and Dertlioglu (2008), during their research for developing a website evaluation scale, emphasized the importance of evaluating the positive and negative aspects of educational websites and they also indicated that adhering to the criteria to be identified will help web developers compose hi-quality websites. Keser, Esgü and Şimşek (2003) highlighted in one of their academic papers, web design principles that was developed by 36 web design experts in Ankara in the year 2002. Fifty-six (56) out of seventy-five (75) nominated principles, indicated in the literature, were approved. This research aims to contribute to the efforts to develop the web based education by providing objective evaluation standards. These principles, in particular, will benefit the future educational designers who are now at the stage of learning by practicing under the supervision of their educators.

As shown by the search through the related literature, there is only a small amount of academic work to mention both in and outside Turkey. Previous studies have not focused on many aspects of online learning, but not the visual design of websites alone. No academic study could be found that examines visual design of educational websites and relates design principles to visual perception theories. There is a gap in academic literature to evaluate educational websites in accordance with various visual perception theories. The authors of this research study evaluated design principles of educational websites according to six (6) theories of visual perception.

Within the scope of visual perception theories:

1. Is there a significant level of difference among average scores of these websites?,
2. Does it make a difference among the average scores of these websites with regards to whether a website was designed in Turkish or English?,
3. Is there a significant level of difference among average scores obtained from evaluational dimensions of these websites?

Method

Research was patterned with the survey method. This section presents information about research participants, data collection tool and data analyses.

Table 1
Evaluated Websites during the Research

Evaluated Websites	Websites in Turkish	Websites in English	Websites for Primary School Level	Websites containing Educational Content
WS 1	X		X	X
WS 2	X		X	X
WS 3	X		X	X
WS 4	X		X	X
WS 5	X		X	X
WS 6		X	X	X
WS 7		X	X	X
WS 8		X	X	X
WS 9		X	X	X
WS 10		X	X	X

Participants

Website selection was based on the criterion that the website in question was fully accessible (no user or password required). Features of the analyzed websites are given in Table 1. Five (5) out of ten (10) selected websites were in Turkish; the other five (5) were in English.

The evaluation form developed by the researchers was used to evaluate 10 websites with educational contents. The research was conducted in two steps. The first step was to develop an evaluation form based on alternative visual perception theories; the second step was to use this instrument to assess selected websites with educational contents.

Research participants were 16 field experts (one in graphic design, two in educational game design, two in graphics and programming, and eleven in education technology). Each of these 16 field experts assessed 10 websites by using gauging tools developed by the researchers.

Data Collection Tool

Within the frame of the research, the “Web-based Educational Context Evaluation Form”, was developed by the researchers to assess web-based educational contexts according to visual perception principles. The Evaluation Form was developed with reference to academic literature and related to visual perception theories.

The evaluation form, which was developed from visual perception theories for assessing an interactive context design, had taken its items from what came out of focus group meetings. While developing the Evaluation Form, 8 dimensions of website evaluation procedure were identified as a result of focus group meetings conducted by 8 field experts in 6 sessions. These identified dimensions are namely: *page layout, color, typography, visuals (pictures, graphics and photographs), animated images/graphics (video, animation, simulation), navigation and browsing, content and functionality*. Dimensions identified during the focus group meetings were re-discussed within the scope of visual perception theories; and sub-items were set out by associating with them.

A host of theories, i.e. Gestalt Theory, Probabilistic Functionalism, Computational Theory, Neuropsychological Theory, Constructivist Visual Perception Theory and Direct Perceptual Theory, came into play both in identifying 8 main dimensions by associating them with interactive context design and in setting out sub-items pertaining to these dimensions. Some of these theories were associated with all the dimensions while some others were associated with just one or a few specific dimensions, in consideration of their distinguishing aspects.

In general, research to evaluate educational websites focus on figure-ground relationship, proximity, continuity, similarity and closure principles, within the scope of Gestalt visual perception theories (Mirielli, 2007; Puustinen, Baker & Lund, 2006; Hsiao & Choub, 2006).

The reason why other visual perception theories were taken into account during the research rather than what is available in the related literature is the fact that the selected perceptual theories are more likely to make an in-depth analysis. In this respect, focus group meetings and discussions among field experts generated eight main dimensions that can be associated with perception theories that are conducive to analysis of the initial interactive context designs. In the next step, dimensions associated with perception theories and distinguishing aspects of these theories were interlinked to create a pool of items. At this point, since the Gestalt Perception Theory provides a sound evaluation framework for perception in the entire design, it was decided to put items based on that theory into each of the eight dimensions. As per Egon Brunswick’s functionality approach, the dimension that came to the fore from focus group meetings was functionality. A relationship was finely established between functionality and perceivability in relation to characteristics of the target community and content presentation according to probabilistic functionality theory.

Items based on probabilistic functionality were set out with reference to this relationship. Marr's Computational Theory highlights integrating characteristics of the perceived context and perceiving community. Hence, this approach underlines the relationship between the target community and each dimension that are generated during the research. In other words, Marr's Computational Theory involves interlinking of many design principles, ranging from visuals to animated graphics as well as from typography to color configuration separately with the target community and in turn studying each of them one by one, and thereafter re-interpreting them as a whole. Therefore, the choice was made to place the items that were associated with Marr's theory in every dimension. The neuropsychological approach, on the other hand, was associated with the main dimension of composition in order to identify a set of items that can be linked to several dimensions such as planning the total, setting out the activities, and presentational hierarchy of the content: hence the items were generated to this end. Constructivist Visual Perception Theory focuses on individual differences. From this point of view, both the functionality, and developing the content, and also the items that are contained within the aspect of defining and interlinking of design components, were all together associated with the Constructivist Theory. Gibson's Direct Visual Perception Theory focuses on meanings of design components within the content's presentation, target community's impression as to them along with the impact that was made by involving characteristics of the target community as a factor in presentation. So, to this end, the items that were associated with the Theory of Direct Perception put forth other items, which were oriented to studying the target community together with its environment and designing the content accordingly.

By composing an evaluation form, it was intended to demonstrate websites' features through rating them with respect to a scale of specific main dimensions and sub-items. The four point Likert-Type evaluation form contained five items for the dimension of page layout, six for color, five for typography, ten for visuals, eight for animated graphics, five for navigation and browsing, five for content and six for functionality, a total of 50 items. Three experts with relevant competencies in the field of educational technology were consulted to ensure that the developed form meets the scope and appearance criteria. The final version of the form was made ready for the application as per feedback collected from the field experts.

Data Analysis

The scales of items in the Web-based Educational Context Evaluation Form were keyed as "completely suitable", "fairly suitable", "slightly suitable" and "not suitable at all/completely unsuitable". Separate comparisons among the average scores that the websites received for each of the dimensions of page layout, color, typography, visuals (pictures, graphics and photographs), animated graphics (video, animation, simulation), navigation and browsing, content and functionality as well as a single comparison among the overall average scores of each website was done by using one way analysis of variance (one way ANOVA test). On the other hand, to detect whether websites' overall scores differ with regards to being designed in Turkish or in English, an independent samples t-test was used.

Findings

Comparison of websites with respect to their average scores

At this section, websites' average scores were calculated. To this end, 10 websites' calculated average scores were compared to each other by using a one way ANOVA test. In conclusion, a significant difference was detected in mean scores of websites ($F(9, 118)=10.412, p<.05$). So to find out which group(s) was/were causing this difference, a Tukey test, which is one of multiple comparison tests, was conducted. The values produced by the test are given in Table 2. WS7 significantly outsourced all the other websites, except WS2.

Table 2
Analysis of variance to show whether websites' overall average scores differ or not

Variable	Source of variance	Sum of squares	df	Mean square	F	p	Difference**
Overall average scores	Between groups	17.263	9	1.918	10.412	.000*	2-4, 2-8, 2-10, 6-4, 7-1, 7-3,
	Within groups	21.738	118	.184			7-4, 7-5, 7-6, 7-8, 7-9, 7-10,
	Total	39.001	127				9-4, 9-10

*p<.05

** Numbers represent the evaluated websites.

Comparison of websites with regards to whether a website was designed in Turkish or English

The hypothesis of the existence of a significant difference between the average scores of websites in Turkish and those in English was tested by using an independent samples t-test. The obtained values are given in Table 3. As a result of the analysis, a significant difference was detected between Turkish and English websites, placing English websites above the Turkish ones ($t(126) = -2.536$, $p = .012$). In other words, average scores of English websites ($\bar{X} = 2.57$) are higher than those of Turkish websites ($\bar{X} = 2.32$).

Table 3
The t-test conducted to show whether websites' overall average scores differ with respect to being designed in Turkish or English

Variable	Group	n	\bar{X}	sd	t	p
Overall average scores	Turkish	64	2.32	.487		
	English	64	2.57	.593	-2.536	.012*

Comparison of websites with respect to evaluational dimensions

During the research, five (5) educational websites in Turkish and five (5) in English were evaluated with respect to dimensions of page layout, color, typography, visuals, animated graphics, navigation and browsing, and content and functionality. The scores that the websites received for evaluational dimensions were compared by using the one way ANOVA test.

The analysis revealed a significant difference among the scores that the websites received for all dimensions. The Tukey test, which is one of the multiple comparison tests, was conducted to find out which group(s) was/were causing this difference (Table 4).

As given in Table 4, significant differences were detected among websites average scores received for page layout ($F(9.147)=4.292$, $p<.05$), color ($F(9.146)=8.530$, $p<.05$), typography ($F(9.146)=5.462$, $p<.05$), visuals ($F(9.126)=12.157$, $p<.05$), animated graphics ($F(9.143)=17.521$, $p<.05$), visuals and browsing ($F(9.147)=2.494$, $p<.05$), content ($F(9.144)=8.452$, $p<.05$) and functionality ($F(9.146)=3.722$, $p<.05$) dimensions. It was seen that the differences among websites' average scores received for each of every dimension was mostly caused by the difference between WS7 and other websites. The lowest difference was received for the dimension of navigation and browsing. Considering the navigation and browsing dimension, it was found that a significant difference only exists between WS7 and WS10.

Table 4

The analysis of variance to show whether websites' average scores differ with respect to dimensions of page layout, color, typography, visuals, animated graphics, navigation and browsing, and content and functionality.

Variable	Source of variance	Sum of squares	df	Mean square	F	p	Difference**
Page layout	Between groups	21.578	9	2.398	4.292	.000*	7-1, 7-4, 7-5, 7-8, 7-10
	Within groups	82.117	147	.559			
	Total	103.695	156				
Color	Between groups	19.454	9	2.162	8.530	.000*	2-10, 6-10, 7-1, 7-3, 7-4, 7-5, 7-8, 7-10, 9-1, 9-4, 9-5, 9-8, 9-10
	Within groups	36.997	146	.253			
	Total	56.451	155				
Typography	Between groups	19.755	9	2.195	5.462	.000*	2-4, 7-1, 7-3, 7-4, 7-5, 7-8, 7-10, 9-1, 9-4, 9-5, 9-10
	Within groups	58.673	146	.402			
	Total	78.428	155				
Visuals	Between groups	42.687	9	4.743	12.157	.000*	1-3, 2-3, 2-4,6-3, 6-4, 6-5, 7-1, 7-3, 7-4,7-5,7-8, 7-10, 8-3, 9-3, 9-4, 9-5, 10-3, 10-4
	Within groups	49.160	126	.390			
	Total	91.846	135				
Animated graphics	Between groups	81.796	9	9.088	17.521	.000*	1-3, 1-4, 1-8, 1-9, 2-3, 2-4, 2-5, 2-8, 2-9, 2-10, 5-8, 6-3, 6-4, 6-8, 6-9, 6-10, 7-3, 7-4, 7-5, 7-8, 7-9, 7-10
	Within groups	74.176	143	.519			
	Total	155.971	152				
Navigation and browsing	Between groups	11.625	9	1.292	2.494	.011*	7-10
	Within groups	76.139	147	.518			
	Total	87.764	156				
Content	Between groups	29.077	9	3.231	8.452	.000*	2-3, 2-4, 7-1, 7-3, 7-4, 7-5, 7-6, 7-8, 7-10, 9-3, 9-4, 9-5, 9-10
	Within groups	55.045	144	.382			
	Total	84.122	153				
Functionality	Between groups	10.184	9	1.132	3.722	.000*	2-10, 7-1, 7-4, 7-8, 7-10
	Within groups	44.381	146	.304			
	Total	54.564	155				

*p<.05

** Numbers represent the evaluated websites.

Discussion and Conclusion

Perception oriented design principles received a higher priority in making educational designs. Expectations regarding the design aspect of websites developed for educational purposes soared up with the rapid spread of internet services over the past decade and the increase in the availability of learning contents in that digital environment.

During the research, 10 educational websites for primary school level, 5 of which were designed in Turkish and another 5 in English, were analyzed by using “Web based Evaluation Form for Educational Contexts”, in consideration of perception oriented design principles. Website assessments were carried out with the participation of 16 field experts.

First, the averages values were calculated out of research participants’ scorings for the analyzed websites’ designs. Then, the websites were compared with each other in terms of average scores. One-to-one comparisons yielded 14 statistically significant differentiations.

Having all the combinations considered, this ratio fell way below the par. That is to say, there does not exist a big difference among websites’ average scores with regards to how much they conform to design principles. However, the English website number 7 received higher scores above all the other websites except Turkish website number 2. In addition to that, it was observed that experts gave significantly higher scores to English websites with educational purposes ($\bar{X}=2.57$) as compared to Turkish ones ($\bar{X}=2.32$), in terms of perception oriented design principles. This evidence can be interpreted in a way that the design principles are considered less while developing Turkish websites with educational contents. Yet, it can be said that both the English and Turkish websites fail to meet the design principles, after making a general evaluation by taking all the average scores into account. Both type of websites failed to go beyond the level of “Slightly suitable”.

The research yielded some critical conclusions by the assessment of design principles employed in the analyzed websites as to selected dimensions, i.e. page layout, color, typography, visuals, animated graphics, navigation and browsing, and content and functionality. The most significant differences were found to exist among websites with “animated imagery/graphics” whereas the least significant differences were “navigation and browsing”. This finding demonstrates that websites differ a lot with regard to the way animated graphics are used whereas they bear similar features with regard to their navigation and browsing tools.

When the average scores received for analyzed eight dimensions of perception-oriented design principles are considered, it is seen that all the average scores are from 2.27 to 2.98. This finding appears to show that the 10 analyzed educational websites do not conform to different dimensions of design principles. Along with this finding, the highest average was received by “navigation and browsing” dimension while the lowest was received by “content and functionality” dimension. Within the constraint of the sample of 10 analyzed websites, this situation points to the fact that educational websites’ navigation and browsing tools show better performance in conforming to design principles while their content and functionality is sub-par.

It can be said that the evaluation form which was used to conduct the research is an effective tool to thoroughly assess websites with educational content, based on feedback from participants who actually used and made a scrutiny of that evaluation form. In addition to that, research participants firmly concur the evaluation form contains dimensions and items that makes it possible to assess much thoroughly the qualities born by the websites.

Relying on the evidence from this study, it is thought that, henceforth, greater attention must be paid by the educational designers and educators to all the design principles in general and to design principles of content and functionality in particular while developing websites with educational contents for primary education. Along with this, it is thought that greater attention

must be paid to visual design principles while developing websites designed in Turkish for educational purposes. By doing so, it is believed that progress can be made in improving the overall quality of Turkish websites for primary education and thus studies in this area may proliferate.

Studies from now on may concentrate on the integration of perception oriented design principles in the process of developing educational websites at the primary education level. Furthermore, the subject of how different dimensions of visual design principles affect the students' success in learning from the educational websites can be studied.

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Editor's Note: This research explores for graduate-student's perception of mobile learning in educational sciences. The results show positive interest, especially where these devices are familiar to and used by students. It also shows that training may be valuable for those with lesser experience.

Graduate Students' Perceptions Toward Mobile-Learning (M-Learning) at the University of Jordan

Faisal M. Khwaileh and Abdelmuhdi Ali AlJarrah

Jordan

Abstract

The purpose of this study was to investigate the graduate students' perceptions toward M-learning, in the Faculty of Educational Sciences at the University of Jordan. A survey questionnaire consisted of 30 statements developed by the researchers was used for data collection. The sample of the study consisted of 323 graduate students who were randomly selected from both programs (MA and PhD). The results of the study showed that there were no negative opinions toward M-learning held by the participants. Also, the results of the study showed that the students are willing to use M-learning and that they believe that M-learning has a lot of advantages. Finally, the results also showed that the students believe that M-learning has some disadvantages that hinder its use.

Keywords: Mobile Learning (M-learning), Graduate Students, Perceptions, Education. Jordan

Introduction

In the short space of five years, mobile learning (M-learning) has moved from being a theory, explored by academic and technology enthusiasts, into a real and valuable contribution to learning (Stead, 2005). The term "M-learning" or "Mobile learning" refers to the use of handheld devices such as PDAs, mobile phones, laptops and any other handheld information technology devices that may be used in teaching and learning (Harriman, 2007).

In terms of differentiating between E-learning and M-learning some commentators see M-learning as being E-learning using mobile devices and wireless transmission. They also see M-learning as allowing learners to move away from the stand-alone computer, to interact with more devices with information being made accessible through a wireless connection to a server (Walton, Childs, & Blenkinsopp, 2005).

According to Stead (2005), countries such as United Kingdom, Italy, and Sweden have been using M-learning for educational purposes for years. They believe that M-learning will help to decrease the problems of young people's literacy and numeracy. Moreover, they believe that M-learning can make learning fun, increase the motivation of students (especially those who hate studying at schools), and support lifelong learning.

In the UK, thousands of mobile handsets have been purchased as learning tools. User trials have successfully helped a wide range of hard-to-reach learners in many different contexts (Stead, 2005). Furthermore, many projects have been used for a long time to help people everywhere in the UK. Some of these projects are "math for those who do not like math", "Using SMS to improve the basic skills of employees", "Practice driving theory test on your mobile" (M-learning, 2007).

A report for the "Portio Research Corporation" showed that at the end of 2005 there were 2,129 billion phone users in the world. Also, the report expect that this number will increase to 4 billion users by 2010. On the other hand, users of mobile phones in the Middle East according to "Zawia

Center for Research” became 75 million at the end of 2005 (Al-Tamimi, 2006). However, this number of users in the Middle East went up to 120 million by the end of 2006 according to (WCIS), (Al-Tamimi, 2007). Statistics show that mobile device adoption is not only widespread but also growing at a significantly fast rate (Zuga, Slaidins, Kapenieks, and Strazds, 2006).

As for the educational contexts, the mobile educational services and research are widely used in some countries and in leading educational institutions around the world like the University of Regensburg in Germany and the Technological University of Alberta, Canada. However, attempts to use mobile communication devices for education in some other countries like Bulgaria are still few and limited mainly to universities (Doneva, Kasakliev, & Totkov, 2006).

A survey conducted by the Ministry of Information and Communications Technology (MoICT) in Jordan found that 86% of Jordanian families have mobile phones, while 36% of them have computers (Asharq Alawsat, 2007). However, this fact is not just limited to Jordan. It may apply to many countries all over the world. In Austria, the market penetration of mobile phones is currently at a level of 81% and the numbers are still increasing. This means that the majority of the population, in general, and the younger, in particular, have a mobile phone available at hand most of the time. Considering this fact, M-learning can be an important instrument for lifelong learning (Holzinger, Nischelwitzer, & Meisenberger, 2007). Since the use of mobile phones and handheld devices among students has dramatically increased, implementation of M-Learning in academic institutions becomes an interesting and urgent need (Amin, Mahmood, Abidin, & Rahman, 2006).

Moreover, the widespread availability of mobile devices and wireless networks offer enormous opportunities for knowledge acquisition both in terms of interaction with sources of information and in terms of collaboration. Developments in microelectronics and telecommunication technologies provide continuing increase of processing power, improved interfaces, extended functionality, and fast, diverse wireless connectivity for mobile terminals. Combined with tendency to go down in price per unit and having advantage of being truly personal, mobile devices have a potential to become a valuable learning and information acquisition tool for everyone (Zuga, et al., 2006). Therefore, mobile technologies offer a tremendous opportunity to re-engage excluded individuals back into society through education, using technology to learn, especially people who feel excluded from traditional forms of education (Keefe, 2003).

M-Learning has the ability to provide rich mobile internet experiences that are accessible, rich in content, efficient, flexible, secure, reliable, and interactive. With the advancement of mobile technology, the traditional classroom-based learning that has been supplemented by other forms of education will be capable of reaching out to a larger audience. M-learning is expected to offer possible solutions that address the shortcomings of the traditional classroom-based education, and it can provide important opportunities for learning and collaborative interaction (Amin, et al., 2006 and Sung, 2005).

Advantages and disadvantages of M-learning

When E-learning was introduced few years ago, one of its biggest failings was the assumption that it could become a solution to all learning problems; that teachers will no longer be required, and that anything could be ‘E-taught’. Success was only about broadcasting good quality learning materials. We now know that this is not true, and that good teachers, communication, collaboration and discovery activities are still essential for a successful class. The good news about M-learning is that it is possible to avoid making the same mistakes because the devices are much simpler and less powerful than PCs in E-learning (Stead, 2006).

Another reason for using M-learning is that the handheld devices provide a cheap alternative to the PC in a format that can easily be taken out into the workplace or wherever the learner needs to

be (Whitsed 2004). Whitsed mentioned other advantages for M-Learning for the medical students who are considered the greatest users of palmtops. He explains that the “major reason for using palmtops in medicine and health is the fact that they can be used anywhere”. He adds “there is evidence that a mobile workforce such as those employed in medicine and health professions may be using hand-held devices as ‘performance support, decision support and productivity tools’ with some 28% of USA physicians using mobile devices as an integral part of their daily work. Therefore, having material on your phone or palmtop means that it is always accessible to you. Whenever you have a spare five minutes, you can use it to practice some learning.

Wireless handheld devices (WHDs) encompass an array of tools such as, cell phones, personal digital assistants (PDAs) and handheld gaming devices. They come in a variety of shapes and sizes, have different operating systems and are used for a range of purposes. Despite the dissimilarities between them, they share five commonalities: 1) Connect ability – they connect to the Internet wirelessly, 2) Wear ability – they are wearable and therefore always at the fingertips of the user, 3) Instant Accessibility – they turn instantly on and off, 4) Flexibility – they can collect data by accommodating a wide variety of peripheral extensions, and 5) Economic Viability – they have much of the computing capability and expandable storage capacity of laptops at a fraction of the cost (Dieterle, 2005).

Most mobile devices are useful in education both as administration, organization and teaching aids for practitioners, and also as learning support tools for students. Moreover, there are some advantages of M-learning such as: portability where students can interact with each other. It is also much easier to accommodate several mobile devices in a classroom than several desktops because are lighter to carry anytime, anywhere. Mobile devices can be used at home, on the train, in hotels, as learning reference tool for quick access to data in the field (Riva and Villani, 2005). Therefore, the concept of mobility (anytime, anywhere- capabilities) of M-learning encourages learning experiences outside classroom-based environment as well as inside it. Inside the classroom, mobile devices provide students with the capabilities to link to activities that do not correspond with either the teacher’s agenda or the curriculum. Apart from that, lifelong learners would also need effective tools to record, organize, and reflect on their mobile learning experiences (Amin, et al., 2006). Finally, many educators consider the core advantage of mobile phones as the high availability of such devices (Holzinger, Nischelwitzer, & Meisenberger, 2007).

On the other hand, we should also consider some disadvantages linked to these technologies. One major disadvantage is the small screen that limits the amount and type of information displayed. Another disadvantage is that storage capacities are small in comparison with PCs and cannot be used by some applications. Moreover, the batteries used with these devices require regular charging, and a common platform is lacking (Riva and Villani, 2005). Many of these have no keyboards, connection speeds are slow, and the processing power of such devices is generally weaker than desktop devices (Stead, 2006).

Research question and aims

This study aimed at investigating the graduate students’ attitudes toward and perceptions of M-learning in the Faculty of Educational Sciences at the University of Jordan based on the graduate students’ knowledge and/or experience with M-learning. To achieve this purpose of the study, the researchers sought to answer the following question:

What are the attitudes of graduate students toward mobile learning (M-learning) at the University of Jordan?

Research terms

Mobile learning (M-learning): is the use of handheld (mobile) devices such as personal digital assistants (PDAs), cell phones, laptops and any other handheld information technology device that may be used in teaching and learning.

- Attitude: is a hypothetical construct that represents an individual's like or dislike for an item.
- Attitudes are positive, negative or neutral views of an “attitude object”.

Research limitations

The research focuses on the attitudes of the graduate students in the Faculty of Educational Sciences, regardless of their awareness level of M-learning.

The research is restricted only to the graduate students in the Faculty of Educational Sciences at the University of Jordan.

Methodology

Participants

The population of this study consisted of all graduate students in the Faculty of Educational Sciences at the University of Jordan during the fall semester of the academic year 2009/2010. There were (41) graduate students attending the MA's and PhD's programs. Table 1 shows the distribution of the population according to gender and study programs despite the fact that gender and study programs were not treated as variables in the study.

Table 1
Distribution of population according to gender and study program

Program Gender	MA' program	PhD's program	Total
Male	225	150	375
Female	421	145	566
Total	646	295	941

However, the researchers distributed the study instrument (a survey questionnaire) to 323 graduate students who were randomly selected from both programs as the sample for this study. The total number of the surveys received back was 314. Table 2 shows the distributions of participants according to their gender and study programs.

Table 2
Distribution of sample according to gender and study program

Program Gender	MA' program	PhD's program	Total
Male	70	53	123
Female	119	72	191
Total	189	125	314

Instrument

A survey questionnaire developed by the researchers was utilized to collect data in order to investigate graduate students' attitudes toward M-learning. The instrument consisted of 30 positively and negatively phrased statements to preclude any response set. Several items, used in other questionnaires from other studies, were re-phrased for this study to meet its purpose. A five point Likert scale was used (5= strongly agree – 1= strongly disagree) and was completed by the participants. The first draft of the questionnaire was sent to a panel of referees to determine its relevancy and validity. Minor changes were suggested by the referees. Upon re-examination of a second draft, consensus among the referees on the questionnaire's design and validity indicated a strong validation of the statements used in the questionnaire. A correlation coefficient value (0.83), calculated on Alfa-Cronbach, was used to test the internal reliability of the questionnaire and it showed an acceptable reliability value. The statements of the questionnaire divided to three sections (axis), which are:

1. Statements from 1-6, to measure "the willing to use M-learning".
2. Statements from 7-17, to measure the advantages of M-learning that support using it.
3. Statements from 18-30, to measure the disadvantages of M-learning that hinder its use.

The score of the survey goes from 30-150, which is the number of statements multiplied by the lowest grade (1= strongly disagree) and by the highest grade (5= strongly agree) on each item. The score 90 which is approximately 60% of the total score for each statement is considered as the measure that indicates whether or not the student has a positive attitude.

Results and Discussion

The main purpose of this study was to investigate the graduate students' perceptions toward M-learning in the Faculty of Educational Sciences at the University of Jordan. In other words, one of the aims of the study was to reveal whether or not there is an orientation toward this concept, regardless of its efficiency.

Descriptive and analytical statistics as well as the Statistical Package for the Social Sciences (SPSS) were used. The major findings for the opinion measures found in the questionnaire are reported in Table 3.

The results of the study also show that the highest percentage (80.73%) was for the first axis of the questionnaire "statements from 1-6 that measure the students' willing to use M-learning." This result reveals the fact that graduate students at the University of Jordan are really willing to use M-learning if it is available and implemented on and off the campus. This positive attitude might be based on the fact that almost all students know how to use such devices and that these are used by them on a daily basis. Therefore, a majority of students show a high number of positive attitudes towards M-learning. This result agrees with the findings of other researchers (Amin, et al., 2006, Sung 2005, and Keefe 2003) that students become willing to use technology if they are used to using it before its application in the educational setting.

The second general mean score for the second axis "statements from 7-17 that measure the advantages of M-learning that support using it" was 80.36%. This result means that there is a general agreement among the students who see the bright side of M-learning and see its advantages as a good vehicle for learning. Such result could be valuable for the University of Jordan who might consider it as a source of support and encouragement for the adoption of M-learning. That is because of the many advantages that the students perceive and that the students believe in these new methods of learning and teaching. In other words, in an era of change and evolution of every educational system around the world, the University of Jordan will anticipate that M-learning will be met with minimal internal resistance from the students.

Table 3
Mean (M) and standard deviation (SD) concerning the items of the questionnaire

Item	Questionnaire Items	Mean	Standard Deviation
1	I would get benefits in my learning if there were M-learning courses at the University of Jordan.	4.46	0.634
2	I believe that I learn better through M-learning material than through lectures.	3.89	1.005
3	I prefer M-learning courses to traditional courses.	3.99	0.995
4	I think M-learning courses are uncomfortable for me.	3.93	0.835
5	I would feel comfortable taking courses through mobile devices.	4.10	0.779
6	I think M-learning implementation should be gradual.	3.93	0.833
7	I think M-learning will save me time.	4.28	0.793
8	I believe M-learning works well with my study program.	3.89	0.952
9	I think M-learning enables me to attend classes more frequently than traditional learning.	4.08	0.946
10	I think M-learning enables me to take more courses than the traditional style of courses.	4.12	0.909
11	I would like to have courses taught using the M-learning methodology.	4.04	0.856
12	I believe that M-learning may saves me effort.	4.17	0.822
13	I believe that M-learning provides me with rich resources.	4.07	0.864
14	I think M-learning provides massive education for learners.	4.08	0.842
15	I think M-learning provides efficiency in teaching.	4.01	0.897
16	I think M-learning minimizes the cost of teaching and learning.	3.82	0.991
17	I think M-learning is easy to monitor the teaching and learning process.	3.78	0.971
18	M-learning will not offer any advantages to me.	3.62	1.172
19	M-learning requires significant changes by the student.	3.66	1.009
20	M-learning courses hinder contribution to classroom discussions.	3.43	1.213
21	M-learning needs well prepared mobile materials.	4.06	0.787

Item	Questionnaire Items	Mean	Standard Deviation
22	M-learning needs sufficient training courses for implementation.	4.13	0.809
23	M-learning needs sufficient ground work.	4.05	0.908
24	M-learning needs variant teaching strategies.	3.96	0.936
25	M-learning poses difficulty in monitoring the evaluation process.	3.18	1.130
26	M-learning causes decline in learners' achievement results.	2.71	1.109
27	M-learning causes fragmentation of work and loss of consistency in learning	2.85	1.095
28	M-learning reduces teamwork and collaboration between students.	3.34	1.228
29	M-learning requires crucial technological infrastructure.	3.57	1.065

Finally, the third axis “statements from 18-29 that measure the disadvantages of M-learning that hinder its use” had a percentage of 68.39%. This means that the students were aware of the fact that M-learning has some disadvantages that hinder its use. In other words, the result of the study show that some requirements must be fulfilled before the implementing of M-learning at the University of Jordan: Instructors and students must have sufficient training; students need to have access to well-prepared teaching materials; and sufficient groundwork must be laid to ensure that the adoption of M-learning is embraced by all involved in the process. More importantly, the survey also reveals that the transition toward M-learning must be done gradually. In sum, results of this study reinforce the earlier findings of Holzinger, Nischelwitzer, & Meisenberger (2007), Stead (2006), Dieterle (2005), and Riva and Villani (2005).

Conclusion

It is hoped that this study will contribute to a better understanding of graduate students' perceptions toward introducing M-learning at the University of Jordan. Based on the results of this study, the researchers indicate that graduate students tend to view M-learning positively and that they are willing to use it. These findings are consistent with other research results presented in the current literature about the topic. Current literature indicates that training is necessary before students are exposed to M-learning. A clear strategy is therefore required prior to the implementation of M-learning. Moreover, the results of the study showed that Jordanian graduate students are well educated and updated with the modern high-tech devices used by educational institutions in the developed countries of the world. Also, students are not only knowledgeable about these high-tech devices but actually use them in their daily life matters. Therefore, it is advisable that this usage is transmitted to educational purposes.

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Editor's Note: This study provides a number of viable answer for the question - What are the key, substantive differences between education and learning?

The Role of Adult Learning - Lifelong Learning or Lifelong Education?

Myra Sellers

USA

Who exactly is considered an adult learner and how does one become a member in this exclusive club? Johnstone and Rivera's (1926) definition comes to mind: "the adult education participant is just as often a woman as a man, has completed high school or more....and is found in all parts of the country" (Merriam and Caffarella, 1999, p. 47). One of the most rapidly developing areas within education is the study and practice of education for and about adults. How can education continue to meet the needs and enhance the education process for adults?

The notion of learning through life is hardly new as a glance at Plato's *Republic* reveals. Plato's relevance to modern day informal educators can be seen at a number of levels. First, he believed, and demonstrated, that educators must have a deep care for the well-being and future of those they work with. Educating is a moral enterprise and it is the duty of educators to search for truth and virtue, and in so doing guide those they have a responsibility to teach.

Second, there is the 'Socratic teaching method'. The teacher must know his or her subject, but, as true philosophers, the teachers also know the limits of their knowledge. It is here that we see the power of dialogue - the joint exploration of a subject - 'knowledge will not come from teaching but from questioning'.

Third, there is Plato's interpretation of the differing educational requirements associated with various life stages. In his work the classical Greek concern was for body and mind. There was importance of exercise and discipline, of storytelling and games. Children enter school at six where they first learn the three Rs (reading, writing and counting) and then engage with music and sports. Plato's philosopher guardians then follow an educational path until they are 50. At eighteen they are to undergo military and physical training; at 21 they enter higher studies; at 30 they begin to study philosophy and serve the *polis* in the army or civil service. At 50 they are ready to rule. This is a model for what we now describe as lifelong education (indeed, some nineteenth century German writers described Plato's scheme as 'andragogy'). It is also a model of the 'learning society' - the *polis* is serviced by educators. It can only exist as a rational form if its members are trained - and continue to grow (Smith, 2001).

R. D. Waller (1956), in his book *A Design for Democracy*, describes a report from the Adult Education committee of the British Ministry of Reconstruction: "Adult education must not be regarded as a luxury for a few exceptional persons here and there, nor as a thing which concerns only a short span of early manhood, but that adult education is a permanent national necessity, an inseparable aspect of citizenship, and therefore should be both universal and lifelong" (1919: 55). This theme was also broadened in Eduard Lindman's (1926) *The Meaning of Adult Education*. Along with his friend and colleague, John Dewey, Lindman argued that:

1. **Education is life:** 'not merely preparation for an unknown kind of future living...The whole of life is learning, therefore education can have no endings. This new venture is called adult education not because it is confined to adults but because adulthood, maturity, defines its limits...' (p. 4-5).
2. **Adult education should be non-vocational:** 'Education conceived as a process coterminous with life revolves about non-vocational ideals... adult education more

accurately defined begins where vocational education leaves off. Its purpose is to put meaning into the whole of life' (ibid.: p. 5).

3. **We should start with situations not subjects:** 'The approach... will be via the route of situations, not subjects... In conventional education the student is required to adjust himself to an established curriculum; in adult education the curriculum is built around the student's needs and interests' (ibid.: p. 6).
4. **We must use the learner's experience:** 'The resource of highest value in adult education is the learner's experience... all genuine education will keep doing and thinking together' (ibid.: p. 6-7).

For many adults, learning is an ongoing and important part of their lives. With the development of a self-consciously 'adult education' came the view that education should be lifelong. Experience plays a huge role in whether or not the learning will continue to be important in the learner's life. The perception of learning in certain groups and individuals has greatly varied. In the past, adults aged fifty or older viewed learning as of little value and working beyond sixty or sixty-five as unwarranted unless finances dictated. Health, environment, ethnic differences all played a part in the viewpoint of whether continued learning was necessary and still plays a part. Many of these attitudes were linked to a study by Moody (as cited in Lowy and O'Connor, 1986) suggesting that adults perceive learning from the vantage point of approximately how much time is left to live. Although never exact, this perspective of time dramatically influences educational goals of the adult.

Many adults, aged sixty to seventy, grew up in the pre-World War II era. Learning was taught, to a great extent, by the instructivist method, by a teacher and knowledge was in the possession of the teacher. Lesson plans were put into motion by the teacher and the material was learned and processed by the students. The students were assessed on their remembering the materials and the skills they possessed. Many students in this era by the seventh grade had dropped out of school out of necessity to go to work and help support their families. Many of these same students were called into armed services and went to serve their country during World War II. Some of the knowledge obtained, especially the reading and writing skills, was helpful during this time and was used by students in their jobs. But mastery of knowledge and schooling was not the most important thing in many families' minds. Survival was the upper most concern and many students never returned to the classroom.

Adult learning has, since World War II, shifted. In the post-World War II era and with the introduction of the GI Bill of Rights, many adults saw the opportunity to, again, pick up pencil and paper (Sheppard, 2002). Higher education was seen as attainable and not just for the affluent. The common man and woman could actually have an education, increase their economic status in the community and their quality of life could be improved. It is for this that many adults chose to seek out educational opportunities.

Adult education is on the rise as is the demand for programs that are beneficial to the adult learner. Adult learners, for the most part, ask themselves self-assessment questions before beginning a task. Adults, typically, set for themselves a strategy of learning. The goal for most adult learners is that they understand and can apply the new information to their present lives. Adult learners will, for the most part, continually ask themselves if they understand the information being given them and whether the information meets their needs and expectations. Vocational changes lead to additional adult learning out of necessity because an even more apparent demand for adult education is supported by research that suggests a twenty-year-old can expect to make six to seven job changes over the course of a working career (Aslanian and Brickell, 1980).

“There are two perspectives that educators view with working with adults: the individual and the contextual. Until recently, the individual perspective, driven by the psychological paradigm, was the predominate way we thought about learning in adulthood. Two basic assumptions form the foundation for this perspective. The first is that learning is something that happens internally, primarily inside of our heads. In essence, the outside environment is given little if any attention in the way we think and learn. Second, this perspective is based on the assumption we can construct a set of principles and competencies that can assist all adults to be more effective learners, no matter what their background or current life situation” (Merriam & Caffarella, 1999).

The first assumption—that learning is something that happens internally, primarily inside our heads—was also expressed by Malcolm Knowles in his 1970 book, *The Modern Practice of Adult Education: Andragogy vs. Pedagogy*. He stated:

“there were four assumptions with adults and learning: self-concept, experience, readiness to learn and orientation to learning. The self-concept principle reflects the self-directing character of the adult learner rather than dependent nature of the child. The principle of experience simply acknowledges the need to draw on the adult's rich source of experience. In contrast, the pedagogical framework perceives the child as not possessing sufficient life experience to effectively incorporate into the learning environment. Readiness to learn indicates that adults differ from children in their developmental stage and as a result have special learning needs. The assumption implies that adult learning needs tend to focus more towards their social roles. On the other hand, pedagogy claims that the learning needs of children are geared towards physiological and mental development stages. Orientation to learning assumes that adults put more value on being able to practically apply their learning while pedagogy suggests that children naturally focus on postponing immediate application for future needs. These four sets of assumptions establish significant guidelines for creating adult learning environments” (p.39).

What then is the implication of higher education with respect to adult learning? Patricia Cranton (1994) states: "Perspectives on adult learning have changed dramatically over the decades. Adult learning has been viewed as a process of being freed from the oppression of being illiterate, a means of gaining knowledge and skills, a way to satisfy learner needs, and a process of critical self-reflection that can lead to transformation. The phenomenon of adult learning is complex and difficult to capture in any one definition" (pg. 3).

The adult population has become increasingly more visible mainly because of the increasing size of the group. Learning in an aging population has become an afterthought to some in the education field. Programs of study are offered as continuing education in community organizations, some educational institutions, and churches just to name a few. But the diversity of the programs does not compliment what is offered to younger students. Education for adults is seen as an add-on and outside the traditional learning establishment. Programs of study offered in traditional institutions do not relate to older non-traditional students in general areas of interest. While some educational institutions try, many fail to reach the masses. Manheimer, Snodgrass, and Moskow-McKenzie (1995) pointed out the lack of a single dominant model of older adult education: "Different groups have a stake in older adult education and related policies but view older adults and their education differently. For example, some educational organizations claim or accept responsibility for education which targets a certain group of citizens, older adults being one of them. Aging organizations, on the other hand, claim or accept responsibility for older adult programs that happen to be educational" (p. 121).

Adults want to contribute to their immediate community and society. They want to be seen as viable individuals and, because of age and experience, want their contributions to be seen as worthwhile. Moody (1976) presented a four-stage model of education for the older adult: (1) rejection, (2) social services, (3) participation, and (4) self-actualization. The first stage, rejection, reflects the isolation of the aged in modern societies, in which "old people are, functionally speaking, nonentities" (p. 3). The second stage, social services, defines older adult education as leisure-time activities. The third stage, participation, prepares older adults for new roles in society through breaking stereotypes of old age. The fourth stage, self-actualization, focuses on the potential of older people to psychologically grow through learning. Moody concluded that the most current educational programs were directed at stages three and four, encouraging educators to respond to the needs of the least needy aged. Throughout the past decades, how have educational programs succeeded? It appears success has not quite happened to the extent some hoped for.

In 1974, the Elderhostel program, a residential educational program for anyone over the age of 55, was created and has rapidly grown to enroll over 300,000 adult participants annually. Currently it offers instruction in more than 1,999 facilities, such as universities and colleges, in more than forty countries around the world (Mills, 1993). With the creation of such programs, adults have the opportunity of participating in beneficial instruction. But the growth of this program leads one to believe that many adults are participating in educational opportunities. This is not true. Only about 4 to 6 percent of senior adults participate in organized educational programs annually (Lowy and O'Connor, 1986). This is a very small percentage of a population that has the time and resources to participate. What can be done to encourage more participation in learning in the adult population? How can educators encourage adult learners to continue in their learning and development of knowledge?

Encouragement, the definition, according to the Encarta Dictionary, is "support of a kind that inspires confidence and a will to continue or develop." The pursuit of an adult learner's goals is different from a young person. Their learning is often self-directed—learners taking the responsibility to learn on their own, to teach themselves something where there is, in many instances, lack of the pressure of time. Adult learners, most often have sensible and logical abilities for planning and guiding their learning. Charles Hayes (1998) states that "when we fail to take control of our education, we fail to take control of our lives. Self-directed inquiry, the process of taking control of your own education... is the lifeblood of democracy" (xiv). Taking control brings the freedom to choose a path where a person would like to go.

In its broadest meaning, 'self-directed learning' describes, according to Malcolm Knowles (1975) a process:

... "in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (p. 18).

Knowles (1975) puts forward three immediate reasons for self-directed learning in adults:

1. "They enter into learning more purposefully and with greater motivation. They also tend to retain and make use of what they learn better and longer than do the reactive learners"(p. 14);
2. "An essential aspect of maturing is developing the ability to take increasing responsibility for our own lives - to become increasingly self-directed" (p. 15); and

3. 'Students entering into these programs without having learned the skills of self-directed inquiry will experience anxiety, frustration, and often failure, and so will their teachers'(15).

As Merriam and Cafferella (1991) comment, this means of conceptualizing the way we learn on our own is very similar to much of the literature on planning and carrying out instruction for adults in formal institutional settings. It is represented as a linear process. Learning then progresses as 'the circumstances created in one episode become the circumstances for the next logical step' (p. 46).

There has been a shift in much of the literature and policy discussions from lifelong education to lifelong learning. There has been an associated tendency to substitute the term adult learning for adult education (Courtney, 1989). One way is to view learning, as a thought process relating to the learner that can occur 'both incidentally and in planned educational activities', while, 'it is only the planned activities we call...education' (Merriam and Brockett 1997: 6). The shift may, as Courtney suggests, reflect a growing interest in learning, 'however unorganized, episodic or experiential' (ibid.), beyond the classroom. And as stated by Tom Bentley in *The Economist* (October 9, 1999), "it requires a shift in our thinking about the fundamental organizational unit of education, from the school, an institution where learning is organized, defined and contained, to the learner, an intelligent agent with the potential to learn from any and all of her encounters with the world around her" (pg. 42).

As the population continues to age and longer life expectancy fuels the education market for adults, educators will have to continue to look for new programs to entice adults to continue in their pursuit of lifelong learning or lifelong education whichever term is applicable. Educators must continue to strive to help students reach their goals because as Mark Smith (1996) states:

"Real poverty comes from settling for dreams defined by others while remaining bereft of our own."

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Editor's Note: This study was designed to analyze the impact of the use of this technology on one course.

Video Lecture Capture in Physiology Courses: Student Attendance, Video Viewing and Correlations to Course Performance

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USA

Keywords: video lecture capture, streaming video, lecture recording, physiology, student performance, attendance, lecture viewing, student engagement, ACCORDENT,

Introduction

Today's college student arrives at college with much more extensive technological experience than ever before. These students expect, and often demand, that university level instruction provides the same level of technological sophistication to which they are accustomed in their daily lives (Pilarski, Johnstone, Pettepher, & Osheroff 2008; White 2009). In response, educators are rapidly amassing innovative teaching tools including multimedia and web enhanced presentations for use in their classrooms.

“The gap between students' perception of technology and that of the faculty continues to widen. Students and faculty continue to view and experience technology very differently. ... At the same time, students' expectations are important, and successful learning-focused organizations have long known they ignore these expectations at their peril.”
(New Media consortium 2008, 7; Woo et al. 2008).

Recording of lectures in colleges and universities is not new; however, the technology available to produce, edit and distribute these recordings has increased in sophistication and become much more readily available in recent years. Many educational institutions have begun to make audio and/or video recordings of lectures in large classes, allowing students access to these recordings via web portals and course management systems (Simpson 2006; Woo et al. 2008; Dey et al. 2009). This new phenomenon has been met with skepticism and, sometimes, fear from many faculty and administrators concerning the potential negative impact on classroom attendance and learning. That being said, it is reported in several studies that this has not been the case in many of these universities (Dey et al. 2009; White 2009). Anecdotally, the idea of dwindling attendance as a result of video capture conjures up images of students lounging in pajamas only half paying attention as the video of the day's lecture plays in the background. Beyond lack of attendance, many questions arise as to whether undergraduate students effectively learn the material in a college level course from viewing the video recording alone.

Certain upper division courses in Human Physiology at the State University of New York, University at Buffalo (UB) are taught in large lecture halls, typically seating 400-430 students. These courses are taught in modules, with each module led by a different instructor. The classroom lectures are recorded using ACCORDENT® technology software to create video lecture captures. The video lecture captures are then housed on the University Instructional Support server and students have the ability to stream the videos at their leisure via the online Blackboard® course management shell. The streaming video lecture capture is played using Real Media Player®, which is readily available on the Web free-of-charge, and installed as a standard on all university public computers.

In the present study the researchers examined the impact of this technology on course attendance and grades in one course. It should be noted that no students enrolled in this course can register to receive only online instruction. Nonetheless, many students choose to attend few lectures or even not to attend the lectures at all, and instead view the video lecture captures at a time that they find more convenient. Other students, however, do attend class and use the streaming video lecture

captures to review lecture material. Thus, for some students, the recordings are a supplement to and not a substitute for attending lectures. Still other students are found on the continuum between these two extremes. All students, regardless of class attendance, had access to the same factual information and PowerPoint slides used by each instructor as these were also made available for students to view or download on Blackboard.

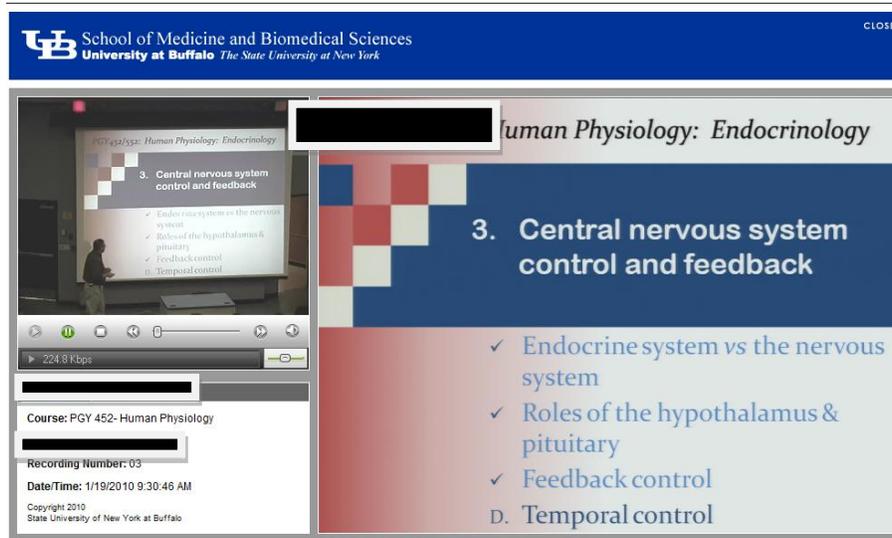


Figure 1: The video lecture capture provides students with a split screen. It displays both the video of the lecture in one window, and any image and video being displayed on the screen in a separate window. The two windows are synchronized to ensure maximum quality. Video availability for student usage is not instant; videos can take 8-24 hours to be available on the web portal.

Purpose

Faculty members and administrators in these courses have expressed an interest in knowing how students are using the video lecture captures, and what affect their method of use has on their academic performance in the course. We therefore compared the performance of students who did not attend class regularly and received lecture material primarily in a digital format with that of students who physically attended most of the lectures and used the streaming video lecture captures for review. The purpose of this study was to determine if using the streaming video capture of lectures as a substitute for class attendance actually allows learning equal to that achieved from lecture attendance, or if it just provides a temptation to not attend lectures and results in impaired learning.

Attendance at lecture allows students to ask questions of the instructor, before, during or after lecture, and also allows the possibility of student discussion of the material and the identification of classmates with whom to study and review. None of these potential advantages are available to isolated students simply watching the video on a computer terminal.

The null hypothesis is that there is no significant difference in performance between students attending lectures and those who watch the videos online and do not attend lecture. Conversely, the alternative hypothesis suggests that there may be a significant difference in class performance between students who attend lectures compared to those who watch the videos without attending lecture. The independent variable is the use the students make of video lecture capture, either as the primary method of acquiring information presented in lectures or as a supplement to attending lectures. The dependent variable is the student's class rank based on overall course grade.

Methods

Population

The population being examined in this study was comprised of students enrolled in an upper division human physiology course at the University of Buffalo. Most of these students are majoring in health and science fields including: nursing, pharmacy, and biomedical sciences. The study population consisted of approximately 365 individuals. The average participating student's ages were largely between 19-25, participant sex ratios were 1:1 (approximately 50% male and 50% female), and the students' ethnic background was similar to the university community as a whole. For purposes of this study the students surveyed were the "typical" college student.

This population was selected for this study because we have a pool of 300-400 students taking the two semester upper division (400-500 level) course sequence that have access to the video lecture capture via Blackboard® course management system each year. This provided a large set of students with similar conditions and modes of instruction and learning from which to draw the sample. This study examined the students in one section of an upper division Physiology course ($n_{\text{total_enrollment}}=364$, $n_{\text{participants}}=122$). To assess the use of video capture we used an optional online survey maintained by a third party website and kept isolated from course faculty. Responses to the survey questions allowed respondents to be placed in one of two categories: those who frequently attended lectures and used the video capture to review, and those who infrequently attended lecture and therefore relied on video capture as their primary source of course material. Respondents were then matched to their overall grade rank in the course.

The use of class ranking was chosen over course grade to enable a comparison of students in different class sections. By examining rank, it also would allow the inclusion of students in other courses in future samples as it would remove issues with varying difficulties of one class or semester to another. The divisions into these categories were based on self identification based on student responses from an online survey. Survey validity was checked for content validity by peer review.

A Mann-Whitney ranked order test was used to compare the groups. G-Power suggests a target sample size of 122 responses based on the following figures give an actual power of .85 ($\delta=2.69$).

Sampling

Recruitment consisted of an announcement via email and announcement within the Blackboard course management shell with informed consent delivered via course management systems, as well as a verbal announcement made at the start of the course. This pool of data were from a convenience sample, those students enrolled in the selected courses were approached about the project. Due the sensitive nature of the data (student grades and class rank), and the potential of perceived threat to the students, their participation had be voluntary. The survey itself was conducted online. The Chair of the Department of Physiology and Biophysics, the individual course coordinators, and the University at Buffalo IRB granted access to the course students within this population.

Respondents in the data pool were found to have similar grade distributions to the class as a whole which suggested that the data were a representative sample of the greater population. Though all students' performance was tracked, those students not wishing to participate were not included in the study data. Course grades were provided in a de-identified form by course instructors and administrators for all those students agreeing to participate in the project.

Instrumentation and materials

Individual exam performance and overall course grades were compiled for those students participating in the study. Grades in this course are based on several hourly exams and a comprehensive final. A point scale was used where each hourly exam is worth the same number

of points and the final exam was more heavily weighted. Letter grades are assigned by total point ranges for the semester. All students are assessed with the same exam questions and have the same number of points available to them to establish reliability and validity. In addition, all students have had access to the same factual information whether by attending lecture or through video lecture capture of the lecture.

The survey asked multiple questions on each of the most important topics. Agreement between responses to each of these related questions assisted in assuring reliability of the survey. Face and content validity were controlled for by seeking feedback from several experts in the field of education, educational technology and survey use in quantitative research. Four experts were consulted and their feedback was incorporated into the construction of the survey and the survey questions.

Data Collection

Data were collected from students in an upper division undergraduate human physiology course. Data collection was done entirely online using an online survey; as well as data collected from course management software and course grades as reported by the course instructors and administrators.

Participants could access the link to the survey through the Blackboard® course management system shell. The survey was housed at an offsite third party commercial survey website (Survey Monkey: <http://www.surveymonkey.com>) to prevent access to survey responses by course instructors, thereby reducing danger perceived by respondents. Students read an informed consent statement, and, if consent was given, the respondents completed the online survey. Course instructors did not have access to this data until the completion of grading for the course. At the conclusion of grading, the results of the survey were de-identified and prepared for analysis.

Data Analysis

This study compared two groups, students who attended the majority of the lectures and also had access to video lecture capture and students who relied on the video lecture capture alone. A Mann-Whitney U test was used for two groups. We used the Mann-Whitney U test because it could be used to compare the students' overall class ranks within each group. This compares rank order of students in two groups based on whether the student was attending most lectures and had the option of viewing the video, or students who attended fewer than half the lectures and relied primarily on the videos. By examining rank, we extend the analysis in the future since rank eliminates the problem of varying difficulties among courses.

Results

The Mann-Whitney ranked order test yielded a significant difference in class score ranking between the two study groups, $w(n_1=50, n_2=78) = 2821.0, p = 0.048$. Those students who attended more lectures were more likely to have a higher rank in the class than the students who attended fewer lectures and relied solely on the video for acquiring lecture material. This can be seen in figure 2.

group	N	Mean Rank	Sum of Ranks
Attended most classes:	50		
Mostly viewed video:	78	56.42	2821.00
Total:	128	69.68	5435.00

	rank
Mann-Whitney U	1546.000
Wilcoxon W	2821.000
Z	-1.973
Asymp. Sig (2-tailed)	0.048

a. Grouping Variable: group

Figure 2 is output from statistical analysis (SPSS) showing significance at $p < 0.05$.

The surveys employed a series of 5-point Likert scales. An average score was also computed based on letter grade in the class. Although data between letter grade groups seen in figure 3 lacked statistical significance between all groups for “how students acquire lecture material” it does demonstrate a stepwise progression in both how students acquire lecture material and how often students attend lectures. Figure 3 does show a significant difference between letter grades in regards to lecture attendance ($t = -5.78$, $p = 0.03$). That is students who attended more lectures received higher letter grades. Universally, students found the recorded lectures helpful or very helpful. Universal indication of student helpfulness is in line with findings of other studies of lecture capture technology (Simpson 2006; Pilarski et al. 2008; Dey et al. 2009).

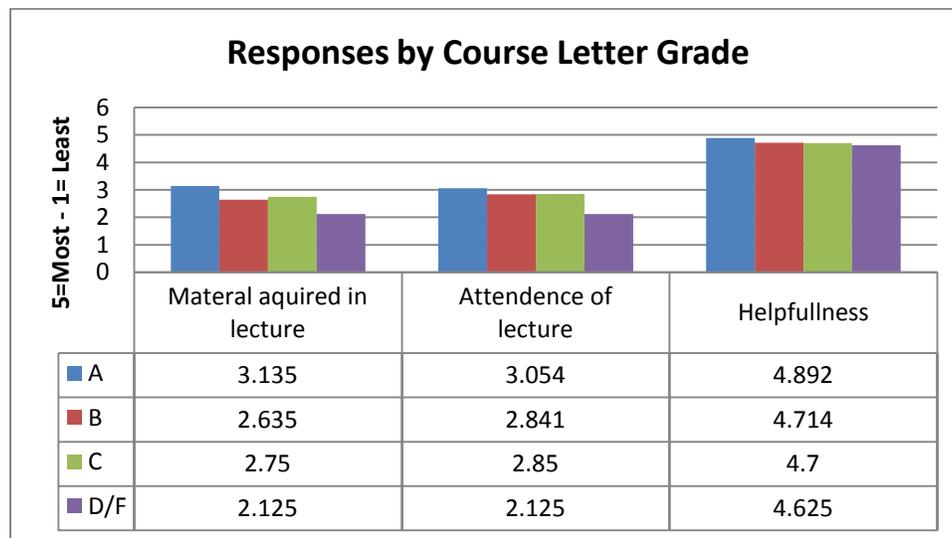


Figure 3. Students’ responses were grouped by letter grade.

An average score was computed for each letter grade grouping based on a specific question. For “Material acquired in lecture” students were asked how much material they reviewed from attending lectures as opposed to viewing recorded lectures, with 5 being entirely acquiring material in the classroom. “Attendance of lecture” is based on student responses to how often they attend lecture where 5 = attended all lectures and 1 represented attended no lectures. “Helpfulness” is how helpful students found access to the streaming video lectures for any reason.

Conclusions & Significance

It is the hope of the researchers that this study will help the instructors and administrators of this and other courses using video capture better understand how students are using the video capture. Further, it will allow educators to better tailor its continued use to enhance learning for future classes of students.

The results suggest that, for this material, students learn more, and by extension get better grades, if they use the video lecture capture as a supplemental learning tool rather than as a substitute for acquiring material through regular lecture attendance. These data should be presented to students similar to encourage them to use video lecture captures to enhance course performance (rank).

One possible question about these results is what environmental factors might be affecting students while they are viewing the videos? Distraction- rich viewing environments would obviously reduce a learner's ability to focus on the lecture material. Students attending lectures have a relatively inherently distraction- free environment. This study also did not examine the viewing habits of the learner. That is, we did not ask if students watched portions of the video in each sitting, watched one entire lecture per viewing or watched several videos back to back. The viewing habits of learners could have impacted student learning.

Future Study

This study was designed to act as a pilot study for a more in-depth review of video lecture capture use. In this forthcoming research actual record of student use will also be compared to the online survey to correlate student voluntary responses. Further this study has allowed for further modification of the survey to better address issues regarding video lecture capture use. Future survey questions will address student usage patterns of the video as well as video viewing environment in an attempt to better understand factors involved in material acquisition.

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Editor's Note: This study provides readers with a practical example of incorporating adult learning theories into asynchronous, web-based courses. The article was written to help course developers understand that to be effective, asynchronous web-based courses (especially those that are not facilitated) must follow basic instructional design and adult learning principles. Educators in the academic and business worlds should benefit from these ideas and guidelines for incorporating basic and valid instructional design techniques in media delivered adult learning.

Five Simple Ways of Incorporating Principles, Theories and Models of Adult Learning into an Asynchronous, Unfacilitated, Web-based Course

Mary Bollash

USA

Abstract

Asynchronous, un-facilitated web-based courses, in which the learner interacts with a computer in order to learn some very specific content, can and should include best practices of adult learning theories and models. The purpose of this qualitative study was to utilize the case study format to provide an example of an un-facilitated, asynchronous web-based course, which includes several best practices from adult learning literature. The case study involves an online course which is distributed to learners who are employees of a Fortune 500 company. These employees are located in divisions all over the world. The course is mandatory for employees who need to access a specific enterprise-wide web application. The intent of the researcher is to provide a possible set of guidelines and best practices for individuals who are tasked with creating such an interactive, web-based course.

Keywords: Asynchronous, web-based, andragogy, self-directed learning, narrative, relevance, experience, immediate application of knowledge.

Introduction

How can a large, global company or organization create an asynchronous, stand-alone, web-based course that presents the content in an effective manner, while ensuring the learner's time is used most efficiently? The answer is by ensuring adult learning principles are incorporated into the design and development of the course. The case study revolves around a one hour, interactive, asynchronous, un-facilitated web-based training module. For this course, there is no instructor. The course is available in languages other than English, but for the purposes of this paper, all examples will be shown from the English version. All of the content is presented to the learner via an interactive web-based training module which is available to learners 24 hours a day, 7 days a week, no matter where they are physically located. The training module was created to introduce the students to an enterprise-wide tool that supports the quality system. For purposes of this article, the tool will be referred to as the SW web tool. This course was intentionally created from original material and not from pre-existing course content. The design and development of this course was done with the intention of developing an effective solution for adult learners. The tool is proprietary to the organization for which it was created, but the training course will be reviewed here so the reader can see how the adult learning theories and principals have been integrated throughout the course. When the course was designed and developed, it was released to approximately 4,000 learners. Feedback from those learners is also included in the results section of this article.

Review of Literature

According to Bruner (2010), “learning is an active process in which learners construct new ideas or concepts based on their current/past knowledge”. Merriam, Cafarella and Baumgartner (2007) summarize the concepts of andragogy, presented by Knowles as : a) adult learners are self-directed learners, b) adults have experience which is a resource for learning, c) adults’ readiness to learn is related to his or her social role, d) adults like to solve problems when they learn so they want information that they can apply to real life challenges, e) adults are internally motivated to learn, and f) adults need to/like to know why they need to learn something (learning should be relevant to them). This model has proven to be accurate in many ways and elements of it are clearly demonstrated in the case study to be reviewed. Merriam et al. (2007), also state that stories are often used to help learners relate to information being taught. The literature clearly shows that narrative learning (through case studies and stories), experiential learning (through hands on application of concepts), reflective learning (through journaling and other techniques), and self directed learning (where the learner is responsible for his or her learning) are all very relevant to technology based learning.

Methodology and Data Collection

The methodology used in this study was three fold. The first step was to identify a course that could be used as the basis for this case. The course selected had to be designed with adult learning in mind. In other words, the course could not have been designed by a content expert that was not an instructional designer. The researcher evaluated five different courses to identify one that utilized the most adult learning principles and practices. The second step was to evaluate various adult learning models and theories for their applicability to online learning. The researcher had to consider various adult learning principles, theories and models and select those with the greatest transferability to asynchronous, un-facilitated, web-based training. The third step was to compare the principles of adult learning to what was in the course. Nothing in the course was allowed to be modified for the purposes of this article, except screen shots that identified the company that owns the tool that the training was designed to support. Learner feedback from the course was also collected in order to determine the effectiveness of the course.

Data Analysis

The best practices described in the literature were identified and examples of the implementation within the case study course were provided. Additionally, graphical elements which depict the best practice were also included in this document to make it clear to the reader how principles of adult learning are incorporated in this very brief course, (Merriam et alii, 2007).

Best Practice from Literature Review: Adult learners want to direct their own learning.

How was it implemented in this course? The navigation lets the learner progress sequentially or skip to sections of the course in which he or she is interested. See Figure 1.

Also, on various screens, the learner has a choice regarding items that he or she would like to learn more about. Branching is provided for role-based tangential information so it is truly the learner’s choice if he or she wants to explore a particular concept further.

Best Practice from Literature Review: Narratives can be used to tell stories. Stories help learners engage with the material and show how the information might be relevant to other learners as well.

Last revised 2/8/2010



Introduction to Standard Work

What Is Standard Work? | Navigation Intro

Navigation Introduction

Click the forward arrow

This course should take you about 90 minutes to complete.

To navigate through this course, please use the navigation menu in the upper right of your screen.

-  You can use the table of contents menu to jump to any page, but it is recommended that you complete this course sequentially at first.
-  The forward arrow will bring you to the next page.
-  The back arrow will bring you to the previous page.
-  The home button will return you to the first screen of the course.
-  The exit button in the upper right hand corner is used to exit this course and have it bookmark your place or track your completion. **Please be sure to exit this course correctly every time.**
-  This character indicates that we are talking about the HS implementation of Standard Work.
-  This logo represents UTC ACE information about Standard Work

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Navigation Menu:

- Navigation Intro
- Objectives
- Standard Work at UTC
- Standard work is...
- Think about this
- ACE Operating System
- Where does it fit?
- Standard work purpose
- General Steps for standard work
- Step 1: Types of standard work

Figures 1a and 1b

How was it implemented in this course?

The entire course is constructed around a scenario involving two people. One of the people is just being introduced to the enterprise-wide tool. She has no experience with it at all, which is the same position that the learners who are taking the course are in as they begin this course. The other has some experience which he is willing to share. Throughout the course, the learner is engaged as he or she follows the novice learning about the tool. The novice asks questions which have been asked by real learners. The novice probes for more information and the pieces of information build on each other. See Figure 2.

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Introduction to Standard Work

What is Standard Work? What is Standard Work? [Navigation icons: Home, Back, Forward, Print, Close]

To learn about Standard Work, we will follow two fictitious employees, Joe helps Leigh learn about Standard Work. When we meet them, it's the end of the day and Joe and Leigh are in the hall way.

Leigh: "I just heard that there is a design review in a few days and that you are presenting. Guess you'll be here all night, huh? At my old job, we used to work nights and weekends just to get ready for reviews."

Joe: "Not really. I am all set for the review. I have all my evidence of closure loaded into the Standard Work web tool. I am leaving now too."

Leigh: "I have heard a little about Standard Work, but since I have only been here three weeks, I don't know much about it. Isn't Standard Work just what's here on the ACE Board?"

(A photograph of a man in a suit and a woman in a hallway, representing the characters Joe and Leigh.)

Figure 2

Best Practice from Literature Review: *Previous experience is a resource for learning.*

How was it implemented in this course? The course connects the enterprise-wide quality system that is well known to most employees with the information about the new tool and how it relates to the quality system, the employees are used to. For new employees, the course also provides background on what the enterprise-wide quality system is and how it works. See Figure 3.

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 **Hamilton Sundstrand**
A United Technologies Company



Introduction to Standard Work

ACE Operating System

Enterprise-wide Quality System Page 16 of 16



This "Big Picture" is the foundation to the Enterprise-wide Quality System.

- Everything starts & ends with the customer (shown in the middle of the picture).
- Typically, we just jump in and start using various tools to try and make improvements.
- To drive business results, we need to follow this "Big Picture" process.

1st = We need to **establish our vision, strategies & goals** - based on the needs of the customer and constraints of the business.

2nd = Based on what the customer requires - **Define metrics**

- Measure for what the customer wants
- Measure on regular daily, weekly, or monthly basis
- Determine opportunities – any performance gaps to the metrics

3rd = **Analyze & execute**

- Perform DIVE process to close gaps using various ACE tools

4th = After we execute to close gaps - we need to **Monitor Progress**

- Communicate back to the customer
- Document/update standard work – to capture & sustain improvements

Figure 3

Best Practice from Literature Review: An adult's readiness to learn is related to his or her social role (Merriam et al. 2007).

How was it implemented in this course? The course has been implemented as a prerequisite to gaining access to the enterprise-wide application that many employees need to do their jobs correctly. This seems as if it may be counter-intuitive to one of the principals of adult learning, which is the internal motivation described by Merriam et al. (2007) while describing Knowles model of andragogy, and to an extent it is. Since this initiative was driven by senior management to meet a business need, internal motivation is not really a factor in this situation.

The course also speaks to the specific roles users can have in the tool and information is presented specifically to that role. See Figure 4.

Best Practice from Literature Review: Adults learn best when attempting to solve problems and apply training to a real life situation. (Merriam et al. 2007).

How was it implemented in this course? The course does this in several ways. It shares success stories of how others have implemented the tool in order to make a positive business difference. (Figure 5). It also gives the learners step by step instructions regarding the actual physical use of the tool (i.e. it shows the learner which buttons to click once he or she is in the tool. (Figure 6).

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Introduction to Standard Work

Roles in Standard Work | Role in Standard Work

Overview of the Roles in the S W Web Tool:

There are several different roles individuals can play in the Standard Work web tool and individuals can and do play multiple roles. These roles are described in this section and are provided to help you answer the question, "What do you need to do in the tool now?" There are Help Modules located behind the "?" in the upper right corner of the Standard Work web tool that describe these processes in detail.

Click on the headings below to find out more about that role. You can also see how these roles interact with each other by clicking on the full Standard Work scenario which is available at the end of this course. Refer to SP0140 for detailed information about these roles.

- Associate - Standard Work is all of our jobs. It is not optional.**
 - Must create or revise Standard Work at the SW Masters level
 - Must also execute Standard Work and provide evidence of closure for an activity
 - Request task tailoring of specific activity blocks and request deviations from standard work
- Supervisor**
 - Must allow his or her Associates into the tool by clicking on "Proficiency" and then "Supervisor" and then "Add/Manage Direct Report"
 - View the level 3 or 4 proficient Associates that report to him or her
 - Manage the proficiencies for his or her Associates per swimlane
- Approvers** (For example: Map Owner, Map Chief, Program Manager, Program Chief, Swim lane owners, Swimlane Experts)
 - Must approve or reject requests to create or revise standard work
 - Must approve or reject standard work that has been created or revised
 - Approve or reject requests for deviations to standard work and Approve or reject requests for task tailoring
- Program Managers & Program Deputies**
 - Can create, revise and launch programs
 - Must manage IPDs and must manage maps
 - Can invite/maintain Outsource (Contractor) Associate access to program
 - Run "program toolbox" reports
 - Maintain evidence access
- Administrators**
 - The administrators are able to manage various things such as: contacts, customers, external links, the glossary, platforms, users, and workflow maps in the tool.

Figure 4.

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Introduction to Standard Work

Navigating the Tool | Execute

Clicking on the **Execute SW** button gives you the ability to execute Standard Work on a particular program. This is where you can task tailor, request deviations, create folders that are used to save evidence of closure and provide evidence of closure. This is discussed in detail in the section of this course entitled "SW Masters or SW Program Level".



The screenshot shows the Standard Work web tool interface. The 'Execute SW' button in the left-hand navigation menu is circled in red. The main content area displays an 'Approval Queue' with several items, a 'Known Issues' section, and 'External Links'. The 'Execute SW' button is located in the left-hand navigation menu, below 'Program Resources' and above 'Proficiency'.

Figure 5

Clicking on the Execute SW button gives you the ability to execute Standard Work on a particular program. This is where you can task tailor, request deviations, create folders that are used to save evidence of closure and provide evidence of closure. This is discussed in detail in the section of this course entitled "SW Masters or SW Program Level".

Figure 6

Findings

Learner Feedback

Learners provided feedback regarding the effectiveness of this course which was collected over a period of about a year. Learner feedback consistently showed that learners felt that when they had completed the course, they could successfully meet the learning objectives. The learning objectives for this course were:

“Upon completion of this course, learners will be able to:

- Describe the steps used to implement Standard Work
- Demonstrate an awareness of what Standard Work is, both from the enterprise and divisional perspectives
- Demonstrate an understanding of the Standard Work web tool
- Identify the benefits of Standard Work
- Recognize transition is a Cultural Change”

The findings of this case study indicate that the principles of adult learning can be incorporated in to asynchronous, un-facilitated web-based courses, if they are considered in the design and development of the web-based course from the beginning. The learners provided qualitative feedback as well, that was a testimonial to the course design. They commented that they felt engaged in the learning and they felt it was relevant. They liked the independence of not being tied to a specific time or location. Additionally, learners felt that taking this training course was an effective use of their time because it only took most learners one hour to complete the module. Once they completed the course, they were able to gain access to the SW Web tool, and apply the knowledge they had gained in the course.

Implications and Conclusions

This particular case study focused on just a few of the principles and theories of adult learning although there are many other models which could have been selected for other types of asynchronous online learning. For example, if a facilitator was participating in the course, models which focused on building a sense of community within the course could have been more prominent (Merriam et al. 2007). If the objective of the course was to change or impact the values of the learner, the transformational learning theory could have played a significant role.

The main conclusion for this study is that the use of instructional design principles, models and theories is appropriate, and based on learner feedback, should be encouraged to make asynchronous, un-facilitated web-based courses effective vehicles for adult learning. It should be noted that courses do not need to be extremely complex or require a large budget to be effective learning tools. Learners completed the course in an hour. This course was created in-house, and it did not utilize significant multimedia elements. The course was also not very complex from a software perspective. In future research, this topic could be developed to demonstrate how other principles and theories of adult learning could be incorporated into asynchronous, un-facilitated, web-based courses.

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About the Author

Mary Bollash is a training and development manager for a division of United Technologies Corporation who has been working in this field since 1991. For the last 15 years, she has specialized in Instructional Design for online learning. Mary is a scholar-practitioner, currently finishing her PhD in Education, from Capella University. Mary also holds Masters Degrees in Instructional Design for Online Learning and in Organizational Management. Her experience and education focus on adult learning, corporate training and designing effective online learning. She also acts as consultant to professors at Manchester Community College, helping them transition their content from on-ground to on-line learning.

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BOOK REVIEW

This is a cogent plea to establish Performance Standards for Distance Education.

An Online Educators' Obligation: Holding the Virtual Self Accountable

Brett Hicks

USA

Keywords: Accountability, Distance Education, Virtual Self, Online, Self-paced, Convenience, Professional, Hicks, Agger, Worldly Self

Introduction

Online educators enjoy a unique and rewarding experience. From their computers, they develop the personal and professional skills of students worldwide. The educator/student relationship is an honored arrangement. The student comes to learn; welcomed by the educator.

In his book, *The Virtual Self*, Agger coined the phrase “*worldly selves*”. He states that an individual “...*plugs into the world via extensions such as the Web and cell phones. The “more” they learn about things that come and go, the less they know about what really matters. Information and entertainment trade off against real depth of insight, the ability to reason and skeptical inquiry.*” I believe this description epitomizes today’s online student. These extensions allow students a vast amount of access to all the information they desire – when they desire it. I believe this *on demand* authority can create a complex educator/student relationship.

Today’s virtual students have decided to include formal education in their hectic lives. They accept the role of student among their daily multi-tasking duties as parents, leaders, workers and members of their community. Online education appeals to them because it is convenient and offers self-paced learning; learning that fits into the busy schedules of today’s professionals. However, a small percentage of students may bring a “worldly self” lifestyle/attitude to the classroom by believing that *self-paced* is code for *when I get around to it*. Educators must be aware of and proactive towards dispelling this belief.

Most troubling are students that are upset with the professor that deducts points for late assignments that have not been pre-approved. Often, these students are *experienced* online students. These students are not just starting out; they are undergraduate junior/senior year equivalents and graduate students. This is where educators must ask themselves some tough questions. Have educators taught or encouraged this behavior or even perhaps fostered it? Have they *educated* students on proper academic etiquette? Are educators to blame for this general disregard for timeliness? Have they reinforced students’ behavior by not holding them accountable?

Distance Learning presents unique challenges for educators. For example, without face-to-face interaction between faculty and student, students present only their virtual selves to their professor and classmates. This makes accountability difficult. Educators must judge attendance and intent in a virtual world where students provide unverifiable reasons for absence or late assignments via e-mails, phone calls or text messages. Without body language or eye contact, the professor only has a student’s previous performance in the course to gauge sincerity.

For the student, the virtual self provides an opportunity to *stretch* the truth. “My dog ate my homework” takes on an entirely different meaning when a student does not have to present himself or herself in person. The ability of some students to hide behind their virtual selves adds a

tricky complexity to the educator/student relationship. Therefore, in this environment, a professor must adopt an all-or-nothing approach to classroom attendance and participation. If faculty members do not universally apply this approach, the hard-line professor runs the risk of alienating these students over a perceived unfairness due to a departure from the norm established during the student's tenure at the University.

Accountability is critical for online education. Many of the detractors of online education argue against asynchronous learning based on a triad. The points of this triad are a lack of academic rigor, qualified faculty and accountability. If we design this triad in the shape of a pyramid, accountability would represent the base.

In my opinion, student accountability is paramount. In order for distance education institutions to overcome the stigma of online education, faculty must act as gatekeepers; protecting the integrity of their respective institutions. This defense begins in the classroom. Distance education institutions distinguish themselves in the same manner as traditional institutions of higher learning. They produce educated, student professionals – even virtual ones.

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