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Editorial

One brick at a time

Donald G. Perrin

All of us have seen buildings rise from their foundations one brick at a time. If you stop to watch, progress seems very slow. Come back at intervals of a few weeks and walls have been built, roofs added, and the interior finished. It has been my joy and privilege to see the transition of education as a result of a new construction – distance learning. Its roots were the correspondence schools in the early 1800s. They used mail as the primary communication link until the early 1900s when experimentation began with motion pictures, instructional radio, and audiovisual technologies.

Learning in large groups

16mm sound motion pictures used in World War II for military training was distance learning in the sense that it made instruction available to over one million service men in a very short period of time. It also resulted in a powerful body of research to support effective use of audiovisual in training and education. After the war, schools adopted 16mm films and experimented with broadcast television. National Educational Television (NET) was set up by the Ford Foundation in 1954, replaced in 1970 by the Public Broadcasting Service (PBS). This was the beginning of distance learning as we know it today.

The primary use of audiovisual was for group instruction, or large group instruction using mass media such as radio, television and motion pictures. Educational film and broadcast television series followed in profusion, improving over time in production design and quality.

In 1963 the Federal Communications Commission (FCC) authorized Instructional Television Fixed Service (ITFS), a one-way, analog, line-of-sight technology. Typical installations included four transmitters multiplexed through a single broadcast antenna with directional receive antennas at each receive site. The microwave signal was converted for distribution over closed-circuit television to classrooms. For Q & A, feedback was primarily by telephone. It took many years for educational institutions to invest in ITFS and other television based technologies.

TV was augmented in the 70s and 80s by cable and satellite television and two-way television. Advent of the United States Distance Learning Association (1987) and TeleCon (1990) led to explosive growth. TeleCon was the world's largest conference and trade show for all forms of teleconferencing, videoconferencing, collaborative computing technologies, and their applications in distance learning, corporate training, business, telecommuting, and telemedicine. By the end of the millennium, education and training via television was transitioning to the World Wide Web, which was ubiquitous and did not require expensive television studios and editing equipment.

Individualized learning

In the mid-1950s, language laboratories, and later, teaching machines, programmed learning and computers, initiated a trend for interactive individualized learning. This moved the locus of control from the teacher to the student, the beginning of self-directed learning. The high cost of mainframe computers and networks kept computers in the experimental realm until the introduction of the personal computer in the late 1970s, access to the ARPAnet in the 1980s, and the graphic user interface with Matrix, Netscape and Windows Explorer in the 1990s.

Language labs were the first interactive technology to be adopted by education. They failed initially because equipment was only part of the system. Like most technologies, it needed maintenance, courseware, and teacher training to be effective. In the 1960s, development of new

curricula, an infusion of innovations and reduction in federal funding, forced a return to traditional methods of teaching until the personal computer revolution of the 1980s.

The personal computer and its mobile counterparts have affected a total paradigm change within education. The digital computer was able to integrate or emulate *all* educational technologies– films, slides, motion pictures, television, overhead projector, telephone, audio and video recorders, players, editors, storage, and copy; teaching machines and programmed learning; interactive networks for two way communication and sharing of resources; learning management systems facilitate teaching and learning, registration, record keeping delivery of lesson materials and tests, and feedback..

Integration of newer technologies

Objections of instructors to distance learning were of two kinds: 1) Instruction was inferior without face-to-face contact, and 2) It was a conspiracy to replace instructors. The first was diffused by extensive research showing the technology based learning was at least as good as traditional instruction. The second was diffused because there was no mass layoff of teachers.

To many instructors, it was apparent that tools and courseware used in distance learning would be valuable in regular classroom instruction, and over time these technologies became available to them. In a similar way, media developed for students with disabilities became available to all students after mainstreaming of students with disabilities in the early 1980s.

Mass learning and individualized learning are now amalgamating with social media. Over time, equipment has become smaller, more powerful, more intuitive, easy to use, more flexible, more reliable, and lower in cost. The Internet, WiFi, and related networks give global connectivity. Distance learning is expanding the capacity of brick and mortar institutions, enrolling learners previously out of reach, and providing educational services free of charge to those with special needs. Geography need no longer be a barrier to which school or institution of higher learning you attend, or in which city, state or country.

In the early days of distance learning, it was discovered that to be successful, learners had to be self-directed and take control of their own learning. This is easier now, because very young children have access to mobile devices and the internet. Experience with technology is having a striking impact on the present generation of learners that become teachers. It will be be even more profound with the next generation, because learners who become teachers, counselors, tutors, or managers of learning, will have gained from the technology and learning experiences of this generation.

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Editor's Note: Education is currently subject to two opposing forces. One is to learn more in the time allotted using advance organizers, instruction design, speed reading, speed listening, and interactive multimedia. The other is just-in-time learning using Google searches, help texts, or learning objects selected and integrated by the computer. Clearly, we need all of these approaches, but much more research data is needed to find the optimal method(s) for specific learner needs. For example, with time compressed audio, what is the role of complexity and familiarity with subject matter in determining optimal time compression? Can we predetermine optimization by class level or should it learner controlled for their individual preference and need. Ray Pastore starts us on that journey with his research on learner preferences and the value of images to complement audio information.

Time-compressed instruction: what compression speeds do learners prefer?

Ray Pastore
USA

Abstract

The study sought to explore learners' perceptions of time-compressed speech in order to help determine what speeds they would prefer when listening for entertainment and learning purposes. Prior research has shown that instruction can be compressed up to 25%, when presented with visuals, without depressing learning (high-level knowledge). In this study, participants answered a 30-question survey concerning their preferences towards compressed speech. They were presented with questions asking how much they preferred speech compressed at 0%, 10%, 20%, 30%, 40%, and 50% both with and without visuals. Participants indicated that they preferred images to no images when speech was compressed. This was not surprising given that it is better to learn from a combination of words and images than it is from words alone (multimedia principle). For compression, participants consistently preferred the 10% compression speed. The implications of these results dictate that if learners or instructors want to compress speech, they should not exceed 10%, even though learning will not diminish up to around 25% compression.

Keywords: time compression, time compressed instruction, students' preferences, audio and sound, multimedia and sound

Introduction

The following paper describes a study that seeks to determine what speeds end users prefer when listening to audio, with and without images, for learning and entertainment purposes. The use of audio narration in English instruction is not new, however, over the last decade audio use in learning has increased exponentially due to the adoption of digital technologies. While audio use has increased in popularity, it carries with it both advantages and disadvantages (as do all forms of media). Some advantages include the ability to listen while one is doing another activity, such as driving or working out, and being able to listen on a mobile device. Additionally, this popularity makes it easier for designers to follow multimedia design guidelines, such as the modality principle, which refers to the idea that listening to audio with images is better for learning than viewing text with images (Pastore, 2012). A major disadvantage to using audio is the time it takes to listen. It takes longer to listen to an audio file than it does to read the same file verbatim. In fact the average human speaks at 150 words per minute yet reads at 280 (Benz, 1971), thus making text a much quick medium - 87% faster. This is quite a disadvantage considering that we are living in an age where time is a luxury that most of us do not have.

As result, researchers have been exploring time-compressed instruction as a means to offset this time advantage that text has. While not new, time compressed instruction is making headlines due to the popularity of podcasting and the fact that audio normally takes longer to listen to. Time compressed speech refers to audio that has been increased in speed yet has not diminished in

quality (Pastore, 2012). This means that one hour of training compressed by 25% would only take 45 minutes. That is a large time savings and can translate to possible money savings for a company who is training hundreds or thousands of employees.

Current research has shown that audio can be compressed up to around 25%, in a multimedia environment, while still allowing learners to retain problem solving knowledge of complex material (Pastore, 2010; Pastore, 2012). This corresponds to the multimedia principle which states that a combination of verbal (narration/text) and non-verbal (images) representations are better for learning than just a single representation by itself (Mayer, 2005). However, according to the modality principle, the use of audio and images is greater for learning than text and images. When text and images are presented, learners need to split their attention between the representations, causing an increase in cognitive load, thus depressing learning (Mayer et al. 2003). When listening to narration and viewing images, they can focus on both representations at the same time. This helps to keep cognitive load levels reduced. As a result, the use of audio is not only gaining popularity due to the podcast but research is recommending it when presented in a multimedia environment.

Nonetheless, recent studies have shown that when audio was presented by itself and compressed at 25%, learning was significantly depressed when compared to no compression or 25% compression with images (Pastore, 2010). Thus instructors need to be careful when compressing audio because if they choose to compress without visual support, learning can be depressed to undesirable levels. In light of that, compressing audio has never been so easy. Users can compress audio directly on their mobile phones using audio editing apps. It's as easy as pushing a button. This means that even if an instructor were to give students non-compressed audio, students may be compressing anyway in order to save time. Thus, given that time is such a valuable resource, why wouldn't an end user compress a one-hour audio file to 25% compression so that they could save 15 minutes? Timesavings are very attractive to the end user. Thus it is critical that time compression preferences are examined to determine if users would compress audio if given the chance. Do they like it? Do they prefer it? At what speeds?

As a result, the following study seeks to determine what speeds end users prefer when listening to audio, with and without images, for various activities including entertainment/personal purposes, instruction, lecture review, audio texts in education, and audio texts for entertainment.

Time-compressed instruction

Current research reveals that audio can be compressed up to 25% in a multimedia environment without sacrificing comprehension of factual and problem solving knowledge (Pastore, 2010; Pastore, 2012). Having said that, audio is very easy to compress and as a result, learners have the ability to compress audio to any speed they would like. Additionally, instructors have the ability to compress audio for lectures, tutorials, and computer based modules. So even though learners can comprehend and perform just as well when audio is compressed up to 25% in a multimedia environment, do they prefer it? Will they enjoy it? Would they rather it not be compressed? At this point in time, there is very little evidence suggesting a compression speed that learners prefer.

Prior research has shown that the normal speech rate for humans is 120-180 words per minute (wpm) and averages 150 wpm (Monroe & Ehringer, 1974; Benz, 1971). However, the average adult reading speed is 280 wpm (Taylor, Frankenpohl, & Pettee, 1960). This leads one to conclude that reading is a better choice when timesavings are a concern. However, the modality effect states that audio narration with images is better for learning than text with images as learners can listen to narration and view images without having to split their attention between representations. As a result, time-compressed instruction speeds can more closely align with the

average adult reading speed, making it a viable alternative to text and normal rate narrated instruction.

Time-compressed speech refers to audio narration that has been increased in speed yet has retained sound quality (Orr & Friedman, 1967). Using advanced algorithms (WSOLA – See methods section of paper for more information on the algorithms), the tempo (beats per minute) is changed while preserving the pitch of the sound (Verhelst & Roelands, 1993). This compression method allows the speed of the narration to be increased without producing a chipmunk like effect (high pitched) that is normally associated with increased audio speeds. In a series of experiments, Honing (2006) revealed that users couldn't distinguish between normal and compressed audio (at low levels). Further analysis by Reed (2003) came to a similar conclusion in a study which found that users could not distinguish between normal paced narration and narration compressed at 20%. Thus users might not even know narration was compressed if kept at low compression levels.

Initial research on time-compressed audio began in the 1940s where researchers examined topics including comprehension, intelligibility, efficiency, and learner characteristics (Duker, 1974). While there is a plethora of research on these topics, much of it is at least 50 years old (if not older) and took place during a time when learners didn't have access to technology like iPods. During that time audio needed to be compressed using sophisticated methods which now can be done on a personal computer (or mobile device) using free software. Additionally, much of this research, which focused on learning, failed to examine time-compression using high-level knowledge (Pastore, 2010). As a result, it is very difficult to interpret much of this literature as both the technology and learners have changed.

Recent research on time-compression reveals that when presented in a multimedia environment, narration can be compressed up to 25%, without sacrificing high-level learning (Pastore, 2012). This assumes that the content was designed well, utilizing instructional design practices, and that the narrator spoke an average of 120-180 wpm. For instance, Pastore (2010) found that audio could be compressed up to 25% in a multimedia environment while allowing learners to retain high-level knowledge and not cause an increase to cognitive load. Similar results were uncovered in another study by Pastore (2012) who examined the effects of time-compressed instruction on learning and redundancy. 154 university students were presented with multimedia instruction compressed at 0% - normal paced, 25%, or 50% compression with redundant text and narration or narration only. Results indicated that students presented 0% and 25% did not differ on tests measuring factual and problem solving knowledge. Similar levels of cognitive load were also reported between the 0% and 25% groups. The 50% condition performed significantly worse in all conditions and the learners reported higher levels of cognitive load. These studies indicate that compressing multimedia up to 25% does not detract from the learning process. However, since learners can compress their own instruction, what speeds will they prefer?

Previous research indicates that learners prefer audio compression around 25% to 35%. For instance Foulke and Sticht (1969) found that leaners prefer audio that is compressed around 30% (from 175 wpm to 212 wpm). More recently, Ritzhaupt, Gomes, and Barron (2008) presented 183 undergraduate students content on podcasting presented at 1.0 (150 wpm), 1.4 (210 wpm), and 1.8 (270 wpm) speeds and put them into treatments consisting of either non-redundant or redundant groups (on-screen text that paraphrased the narration). Participants favored the 210 wpm condition over normal paced speech and 270 wpm. However, different conclusions were made in another study by Ritzhaupt and Barron (2008) who presented 305 students with audio compressed at normal speed (150 words per minute), 1.5 times (225 wpm), 2.0 times (300 wpm), and 2.5 times (375 wpm) both with and without images. They found that participants in the normal compressed groups were significantly more satisfied than those in the other groups. However, it is important to note that throughout this research no participants had the chance to

listen to different speeds to see which they would prefer. Would they have selected a different speed had they been able to compare them? Additionally what formats (i.e., by itself or with visuals) would they have preferred? The following section will examine the use of visuals in instruction to help better understand this phenomenon.

Multimedia

Given that time-compressed instruction is most effective when delivered in a multimedia environment, it is vital to explore whether learners actually prefer this method of instructional delivery and under what conditions. The multimedia principle states that learning from a combination of verbal (narration and text) and non-verbal (images, graphs, and icons) representations, that explain for one another, is better for learning than from just one representation by itself (Mayer, 2005). The multimedia principle has been demonstrated multiple times in the literature by Mayer and colleagues in a myriad of experimental conditions (Tindall-Ford, Chandler, & Sweller 1997; Austin, 2009; Eilam & Poyas, 2008).

This theory stems from Paivio's dual coding theory which suggests that our short-term (or working) memory is comprised of separate memory channels (verbal and non-verbal) that can each process a certain amount of information before becoming overworked (Paivio, 1991). This is unlike long-term memory which is said to have unlimited storage space. According to dual coding theory, the verbal and non-verbal memory channels process information separately, however, they are interconnected though both associative and referential connectors. More recently, Mayer and colleagues have expanded this theory to develop the cognitive theory of multimedia learning (CTML) (Mayer, 2005). The CTML has three assumptions which expand dual coding. They include the idea that working memory is made up of a multi (dual) modal input channel system, that there is a limited capacity for storage in working memory, and that learners engage in active processing. Together these theories help to explain how and why multimedia learning benefits learners. Examples of these theories can be seen spread throughout much of the instructional design literature. For instance Austin (2009) found, through a series of experiments, that multimedia design significantly affects performance of high-level learning. In addition to the multimedia principle, research has focused on types of media and representations used in order to expand the multimedia principle to apply to more specific types of design. For instance, the modality effect, a result of the multimedia principle research, states that spoken words (narration) are better for learning than text in a multimedia environment (Mayer & Anderson 1992). This is due to learners not having to split their attention between representations (i.e., images and text vs. images and spoken words). In this environment, learners could focus on the image and listen to the text at the same time instead of having to hold a representation to focus on the other. As a result, the modality effect has led to a myriad of experiments examining the role that audio narration has in multimedia. For instance, Fiorella, Vogel-Walcutt, and Schatz (2012) found that modality and split attention affect test performance. In this experiment, 60 participants were presented with conditions of visuals with narration, printed text, or no text/narration. Participants in the visual with narration groups scored significantly higher on tests of declarative, procedural, and integrated knowledge. Similar results have been uncovered in studies on the modality effect (Pastore, 2012; Mousavi et al. 1995; Mayer & Anderson 1992; Mayer et al. 2003).

As can be seen from the multimedia theories, the use of images and text representations for learning can benefit high order learning. The modality principle expands this by showing that images and narration better manage cognitive load than images with text. Thus, using time-compressed instruction, to align with these recommendations, becomes an attractive option given that it will take away the time savings advantage that unique to text. However, the question still remains whether or not users will actually prefer compressed speech with or without images.

Purpose

The following paper seeks to explore learners' perceptions of time-compressed speech to help determine what speeds and situations (entertainment, lecture/instruction, and listening to an audio book) they prefer. Given that users can learn from time-compressed instruction (up to 25% in a multimedia environment) and time is valuable, it is expected that students will prefer the 20% and/or 30% compression groups for all situations when presented with visuals. It is expected that learners will prefer 0% to 10% compression speeds when no visuals are presented as learning has been shown to decrease when speech is compressed without visuals.

Methods

Participants

There were a total of ninety-two participants in this study. One hundred and two participants originally volunteered but 10 were eliminated because they did not finish the survey. 72% (66) were female and 28% (26) were male. All were over the age of 18 years old. They were undergraduate students (education majors) in instructional technology classes at a mid-sized university. 92% indicated that they owned an mp3 player, 99% owned a computer, 100% knew what a podcast was, and 86% had listened to a podcast. 5% indicated they listen to podcasts on a regular basis, and 76% indicated they prefer video or podcasts with images to just audio podcasts. Over 50% indicated they have listened to podcasts for their classes. Only had 5% indicated they had previously listened to compressed speech.

Survey

A survey was presented to participants which consisted of 30 questions. The first 20 questions consisted of demographics information, disability information (hearing and seeing), as well as questions about technology experience. The final 10 questions asked participants to listen to compressed instruction at 0%, 10%, 20%, 30%, 40%, and 50% with and without images. Each of these was broken up into 5 parts where students would listen to audio narration compressed at the selected speed (with or without images) and asked the following Likert-scale questions:

1. How much would you prefer this speed when listening to content for entertainment/personal purposes?
2. How much would you prefer this speed for instruction and/or learning?
3. How much would you prefer this speed for a review of a classroom lecture that you have already heard (i.e., review)?
4. How much would you prefer this speed for an audio book being read for entertainment?
5. How much would you prefer this speed for an audio book being read for educational purposes?

These were Likert-scale questions seeking learners' preference (Did prefer/Did not prefer). They were given on a 5-point scale. Thus students would first listen to the 0% (no compression) speed and then asked the five questions. Then they would listen to 10%, 20%, 30%, 40%, and 50% compression and after each, they would answer the five questions. Then participants repeated the whole process except this time an image was presented in addition to the narration.

Audio narration

Audio narration was recorded by an adult male in his native language, English. The recording was completed using Audacity recording software at a normal narration speed (164 words per minute) and fell in the 120-180 wpm average.

Compression

The audio narration was compressed to the following speeds: 10%, 20%, 30%, 40%, and 50%. It was compressed using Audacity software, which is a free open-source software package available at http://audacity.sourceforge.net/. The 'Tempo Change' feature in Audacity was used to compress the audio. It utilizes the Waveform Similarity base Overlap-Add (WSOLA) algorithm which is designed to transform the tempo while preserving the pitch. This is recognized as a means to compress speech at a high quality (Roelands and Verhelst, 1993).

Table 1
Compression speeds with words per minute

	0%	10%	20%	30%	40%	50%
Words Per Minute	164	180	197	213	230	246

Materials and content

The material utilized for the survey was originally developed by Dwyer (1965) and modified by Dwyer and Lamberski (1983). While only a sample was taken from the instructional material, the entire content consisted of a 2,000-word script in English (of the human heart and its parts) and 19 static simple line drawings with color-coded shaded regions to highlight the concepts being discussed. One sample drawing and paragraph from the entire script was taken and used for this study. Using only one sample of compressed instruction controlled for variations that might occur with more than one. However, it is also a limitation of this study since participants did not have a choice in the content used. Additionally, participants viewed the same content several times. As a result, duplicity and mental exhaustion of content are limitations in this study.

Procedure

Participants completed the survey via Survey Monkey during instructional technology undergraduate classes in the Fall 11, Spring 12, and Fall 12 semesters. Headphones were worn for each section of the survey where students had to listen to audio content. Learners would first listen to the audio, then answer the Likert-scale questions. This took place for each of the questions.

Results

The survey data was analyzed via SPSS 16. Descriptive statistics were first examined which were then followed by a series of repeated measure ANOVAs. Repeated measure ANOVAs are recommended when all of the participants go through each condition over time (Field, 2009). This includes Likert-scale survey data as was collected in this study (Gliner, Morgan, Leech, 2009; Leech, Barrett, & Morgan, 2011). The independent variables for the ANOVA tests were Visuals (Visuals or No Visuals) and Time (0% -normal speech, 10%, 20%, 30%, 40%, and 50% compression speeds).

Repeated measure ANOVAs were conducted for each of the following five survey questions (5 with images and 5 without images) as described in the methods section of this paper. Each question was then analyzed separately. All assumptions were tested (Independence of residuals, Homogeneity of variance, Normality, and Sphericity) and not violated unless otherwise noted for each test (Lomax, 2001). For each question, analysis of the Mauchly's test revealed a violation of Sphericity for the main effect of Time and for the interaction Visuals by Time. As a result, the Greenhouse and Geisser test was used as epsilon (ε) was less than .75 (Field, 2009; Girden, 1992). Descriptions of the tests are described below.

Question 1: How much would you prefer this speed when listening to content for entertainment/personal purposes?

Descriptive statistics were first analyzed for each group as displayed in Table 2.

Table 2
Survey data for question 1

Speed	No Image		Image	
	M	SD	M	SD
0%	3.20	.997	3.02	1.26
10%	3.27	.950	3.51	1.00
20%	2.83	1.04	3.23	.800
30%	2.22	1.06	2.63	1.04
40%	1.68	1.01	1.96	.876
50%	1.42	.940	1.47	.870

*5 = Prefer and 1 = Did not prefer

The repeated measures ANOVA revealed a significant Interaction between Time and Visuals, $F(5, 455) = 4.993$; $p = .002$; partial eta squared .052. Figure 1 indicates that the effects of compression increase from 0% to 10% compression. At that point, preference begins to steadily decline whether visuals or no visuals are used. Preferences for visuals remained higher at all levels except 0% compression. Simple effect tests were then conducted via SPSS to examine this interaction further (Field, 2009; Pallant, 2007; Pallant 2009).

For the Visual variable, there were significant simple main effects for the 20% ($F(1, 91) = 11.08$; $p = .001$), 30% ($F(1, 91) = 15.15$; $p < .001$), and 40% ($F(1, 91) = 9.064$; $p = .003$) compression speeds. For these compression speeds, visuals were preferred to no visuals. The other groups were not found to be significant: 0% ($F(1, 91) = 1.84$; $p = .178$), 10% ($F(1, 91) = 3.84$; $p = .053$), and 50% ($F(1, 91) = .79$; $p = .3.74$).

For the Time variable, there were significant simple main effects for the visual ($F(5, 87) = 39.63$; $p < .001$) and no visual variations ($F(5, 87) = 51.75$; $p < .001$). Further post hoc analysis was competed. When images were presented, there was not a significant difference between the 0% and 20% ($p = .221$) or the 0% and 30% ($p = .051$) compression speeds. All other speeds were significantly different from one another ($p < .001$). When images were not present 0% was not significantly different from the 10% ($p = .498$) compression speed. 0% and 20% were different at $p = .023$ and all other speeds were significantly different from one another at $p < .001$.

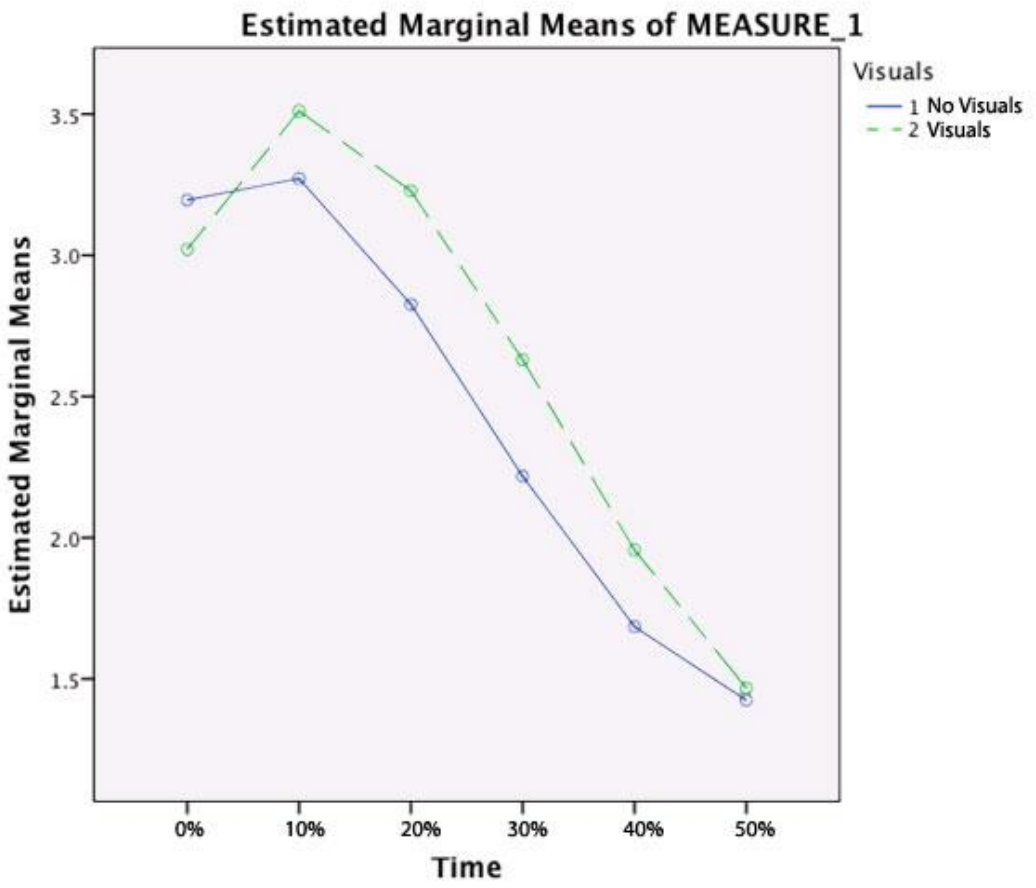

Figure 1: Visual by Time graph for question 1

Question 2: How much would you prefer this speed for instruction and/or learning?

Descriptive statistics were first analyzed and are displayed in Table 3.

Table 3
Survey data for question 2

Speed	No Image		Image	
	M	SD	M	SD
0%	3.33	1.08	3.63	1.09
10%	3.14	.933	3.77	.800
20%	2.22	.936	3.01	.819
30%	1.79	1.00	2.28	.869
40%	1.54	.882	1.79	.819
50%	1.37	.808	1.39	.741

*5 = Prefer and 1 = Did not prefer

The repeated measures ANOVA revealed a significant interaction between Time and Visuals $F(5, 455) = 8.43$; $p < .001$; partial eta squared .085. Figure 2 indicates that the participant's preferences towards visuals increased at 10% then continued to decrease. When presented without visuals, participants preferred 0% compression, which decreased slowly to 10%, then rapidly to 50%. Simple effect tests were then conducted via SPSS to examine this interaction further (Field, 2009; Pallant, 2007; Pallant 2009).

For the Visual variable, there were significant simple main effects for the 10% ($F(1, 91) = 26.53$; $p < .01$), 20% ($F(1, 91) = 48.32$; $p < .001$), 30% ($F(1, 91) = 24.73$; $p < .001$), and 40% ($F(1, 91) = 12.68$; $p < .001$) compression speeds. For these compression speeds, visuals were preferred to no visuals. The other speeds were not found to be significantly different: 0% ($F(1, 91) = 3.92$; $p = .51$) and 50% ($F(1, 91) = .22$; $p = .64$).

For the Time variable, there were significant simple main effects for the visual ($F(5, 87) = 55.98$; $p < .001$) and no visual variations ($F(5, 87) = 71.89$; $p < .001$). Further post hoc analysis was competed. When presented with images, there was not a significant difference between the 0% and 10% ($p = .135$) compression speeds. The 40% and 50% speeds were significantly different at $p = .011$ and all other speeds were significantly different from one another at $p < .001$. When not presented images, there was no significant difference between the 0% and 10% ($p = .197$) speeds. All other speeds were significantly different from one another at $p < .001$.

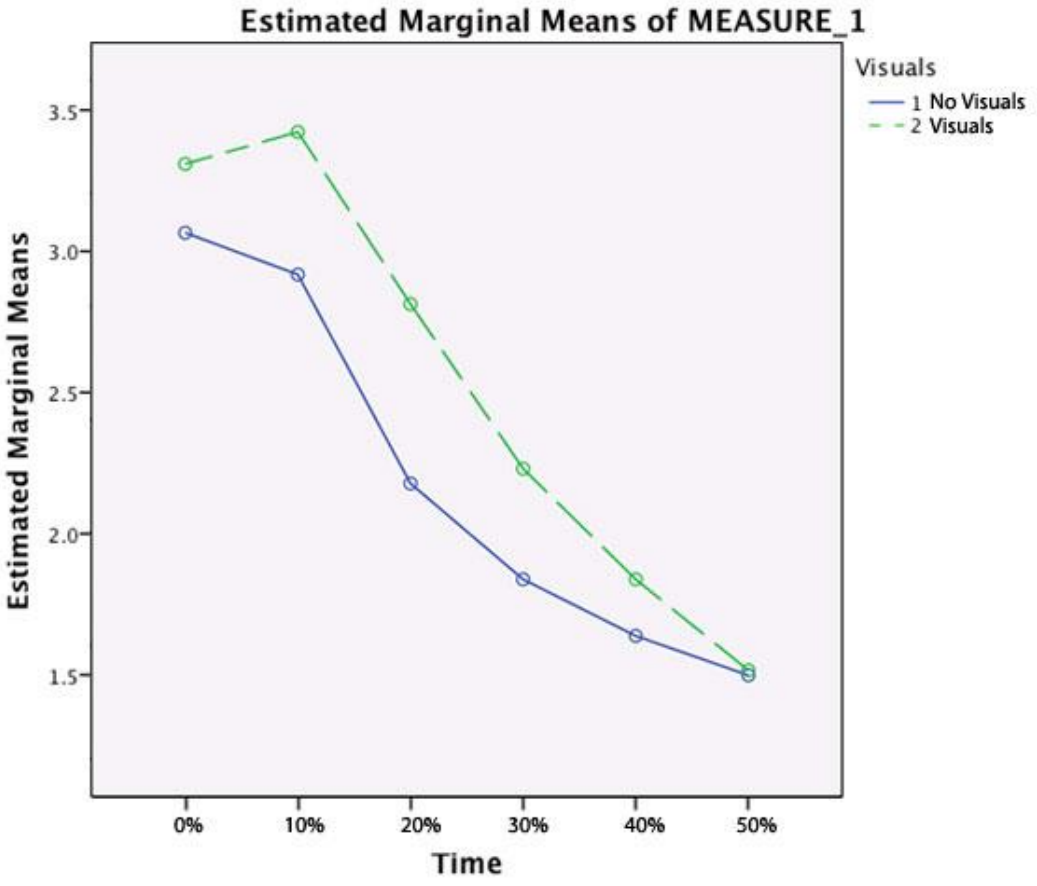

Figure 2: Visual by Time graph for question 2

Question 3: How much would you prefer this speed for a review of a classroom lecture that you have already heard (i.e., review)?

Descriptive statistics were first analyzed and are displayed in Table 4.

Table 4
Survey data for question 3

Speed	No Image		Image	
	M	SD	M	SD
0%	3.41	.963	3.27	1.07
10%	3.43	.816	3.67	.786
20%	2.65	.943	3.24	.790
30%	2.04	1.09	2.50	.966
40%	1.62	.947	1.89	.858
50%	1.41	.891	1.45	.843

*5 = Prefer and 1 = Did not prefer

The repeated measures ANOVA revealed a significant interaction between Time and Visuals $F(5, 455) = 19.13$; $p < .001$; partial eta squared = .174. Figure 3 indicates that preferences increased slightly at 10% then decreased until 50% compression whether or not visual were presented. Simple effect tests were then conducted via SPSS to examine this interaction further (Field, 2009; Pallant, 2007; Pallant 2009).

For the Visual variable, there were significant simple main effects for the 10% ($F(1, 91) = 4.4$; $p = .039$), 20% ($F(1, 91) = 28.193$; $p < .001$), 30% ($F(1, 91) = 18.02$; $p < .001$), and 40% ($F(1, 91) = 11.40$; $p = .001$) compression speeds. Speeds at these levels indicated that visuals were preferred to no visuals. The other speeds were not found to be significant: 0% ($F(1, 91) = 1.50$; $p = .223$) and 50% ($F(1, 91) = .38$; $p = .53$).

For the Time variable, there were significant simple main effects for the Visual ($F(5, 87) = 62.23$; $p < .001$) and No Visual variations ($F(5, 87) = 65.84$; $p < .001$). Further post hoc analysis was then completed. When presented visuals, there was no significant difference between the 0% and 20% ($p = .835$) compression speeds. All other compression speeds were significantly different from one another ($p < .001$). When presented no visuals, there was no significant difference between the 0% and 10% ($p = .840$) speeds. 40% and 50% speeds were significantly different at $p = .003$ and all other speeds were significantly different from one another at $p < .001$.

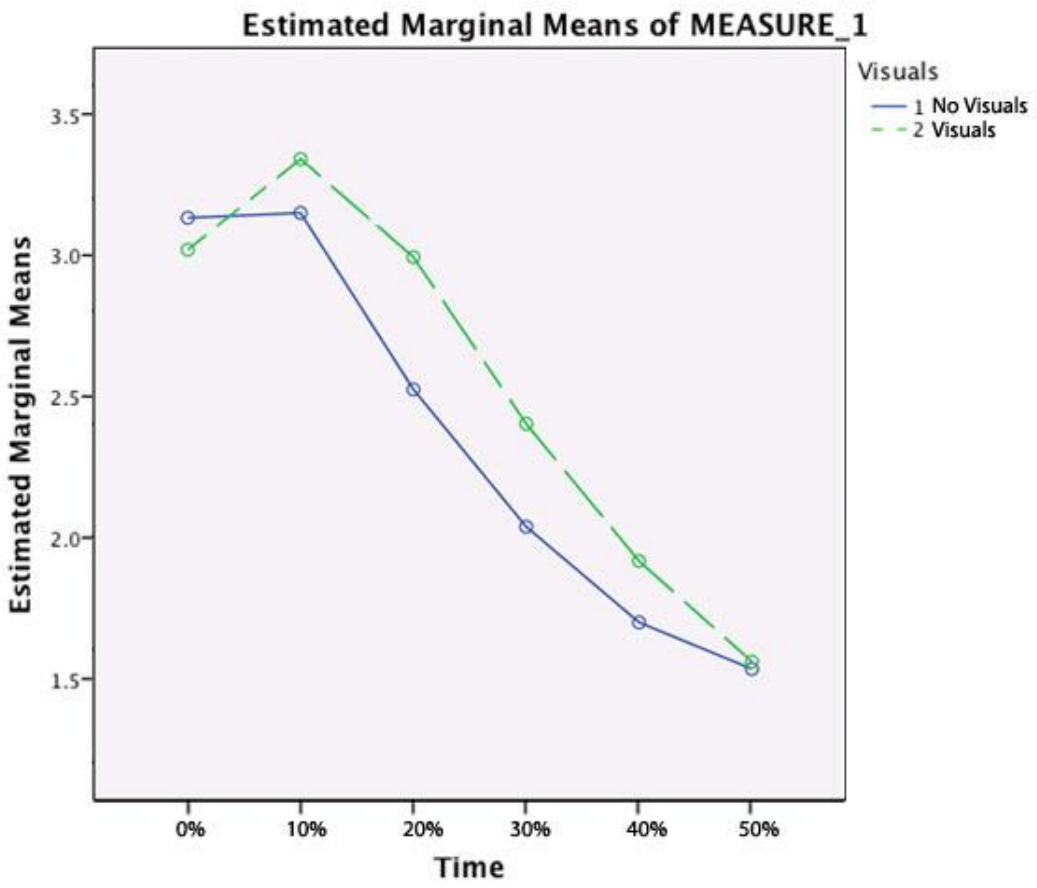

Figure 3: Visual by Time graph for question 3

Question 4: How much would you prefer this speed for an audio book being read for entertainment?

Descriptive statistics were first analyzed and are displayed in Table 5.

Table 5: Survey data for question 4

Speed	No Image		Image	
	M	SD	M	SD
0%	3.35	1.04	3.08	1.23
10%	3.27	.878	3.50	.932
20%	2.73	1.05	3.13	.841
30%	2.03	1.05	2.49	.989
40%	1.62	.970	1.83	.833
50%	1.46	.988	1.49	.908

*5 = Prefer and 1 = Did not prefer

The repeated measures ANOVA revealed a significant interaction between Time and Visuals $F(5, 455) = 9.01$; $p = .003$ partial eta squared = .090. Figure 4 indicates that when presented with visuals, preferences increased at 10% compression then decreased until 50%. Preferences decreased gradually to 10% compression then rapidly declined to 50% when no visuals were presented. Simple effect tests were then conducted via SPSS to examine this interaction further (Field, 2009; Pallant, 2007; Pallant 2009).

For the Visual variable, there were significant simple main effects for the 0% ($F(1, 91) = 3.95$; $p = .050$), 20% ($F(1, 91) = 13.05$; $p < .001$), 30% ($F(1, 91) = 23.95$; $p < .001$), and 40% ($F(1, 91) = 6.48$; $p = .013$) compression speeds. At these speeds, visuals were preferred to no visuals. The other compression speeds were not found to be significant: 10% ($F(1, 91) = 3.51$; $p = .064$) and 50% ($F(1, 91) = .52$; $p = .47$).

For the Time variable, there were significant simple main effects for the Visual ($F(5, 87) = 42.82$; $p < .001$) and No Visual variations ($F(5, 87) = 48.09$; $p < .001$). Further post hoc analysis was then completed. When presented with images, there was no significant difference between 0% and 20% ($p = .734$) compression speeds. 10% and 20% compression speeds were significantly different at $p = .005$ and 0% and 30% compression speeds were significantly different at $p = .004$. All other speeds were significantly different from one another at $p < .001$. When presented no visuals, there was no significant difference between 0% and 10% ($p = .493$) speeds. Compression speeds of 40% and 50% were significantly different at $p = .025$ and all other speeds were significantly different from one another at $p < .001$.

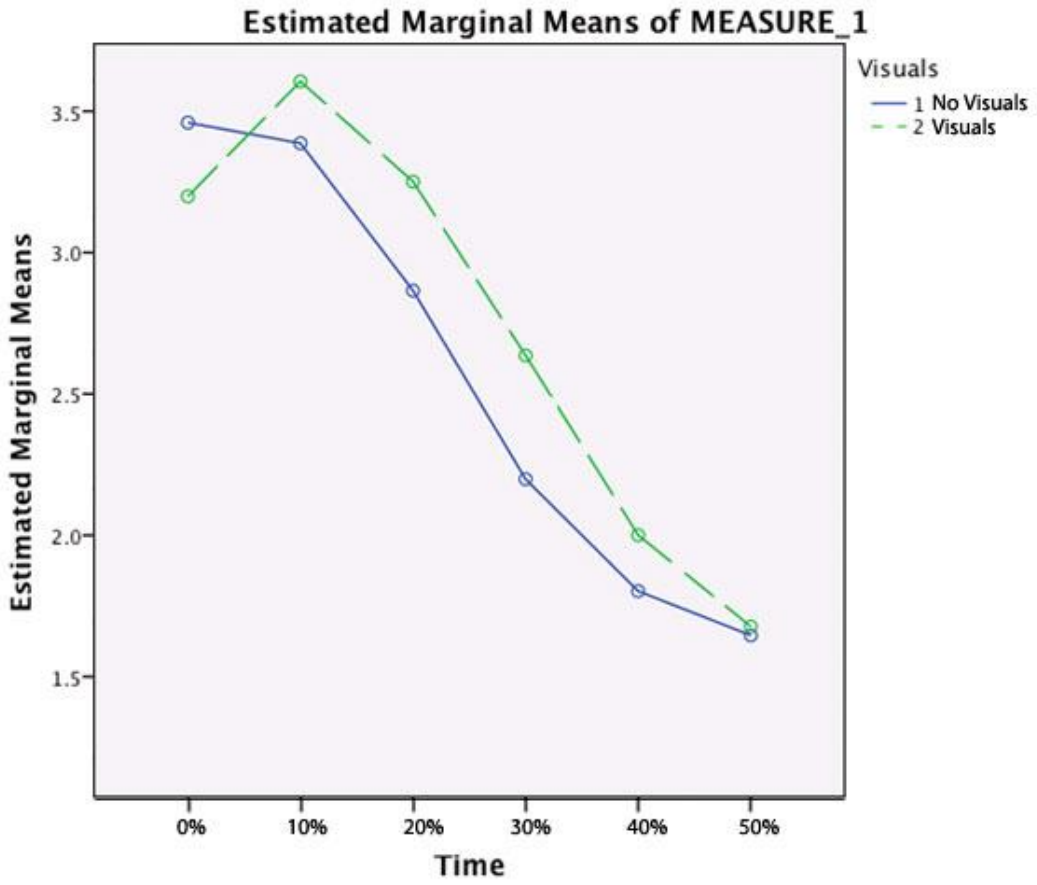

Figure 4: Visual by Time graph for question 4

Question 5: How much would you prefer this speed for an audio book being read for educational purposes?

Descriptive statistics were first analyzed and are displayed in Table 6.

Table 6
Survey data for question 5

Speed	No Image		Image	
	M	SD	M	SD
0%	3.43	.976	3.43	1.14
10%	3.11	.919	3.66	.842
20%	2.32	.994	2.97	.762
30%	1.86	1.05	2.25	.897
40%	1.59	.985	1.74	.768
50%	1.39	.901	1.42	.855

*5 = Prefer and 1 = Did not prefer

The repeated measures ANOVA revealed a significant interaction between Time and Visuals $F(5, 455) = 8.78$; $p < .001$ partial eta squared = .088. Figure 5 indicates that when presented with visuals preferences increased at 10% compression then continued to decrease until 50%. When presented no visuals, preferences decreased from 0% to 50% compression speeds. Simple effect tests were then conducted via SPSS to examine this interaction further (Field, 2009; Pallant, 2007; Pallant 2009).

For the Visual variable, there were significant simple main effects for the 10% ($F(1, 91) = 19.38$; $p < .001$), 20% ($F(1, 91) = 37.53$; $p < .001$), and 30% ($F(1, 91) = 17.83$; $p < .001$ compression speeds. At these speeds visuals were preferred to no visuals. The other speeds were not found to be significant: 0% ($F(1, 91) = .000$; $p = 1.00$), 40% ($F(1, 91) = 3.8$; $p = .052$, and 50% ($F(1, 91) = .59$; $p = .44$).

For the Time variable, there were significant simple main effects for the Visual ($F(5, 87) = 52.90$; $p < .001$) and No Visual variations ($F(5, 87) = 58.03$; $p < .001$). Further post hoc analysis was then completed. When presented with visuals, 0% compression differed from 10% ($p = .001$), 40% differed from 50% ($p = .002$), and all other speeds were significantly different from one another at $p < .001$. When presented with no visuals, all compression speeds were significantly different from one another. 0% and 10% were significantly different at $p = .046$, 0% and 20% were significantly different at $p = .002$, and all other groups were significantly different from one another at $p < .001$.

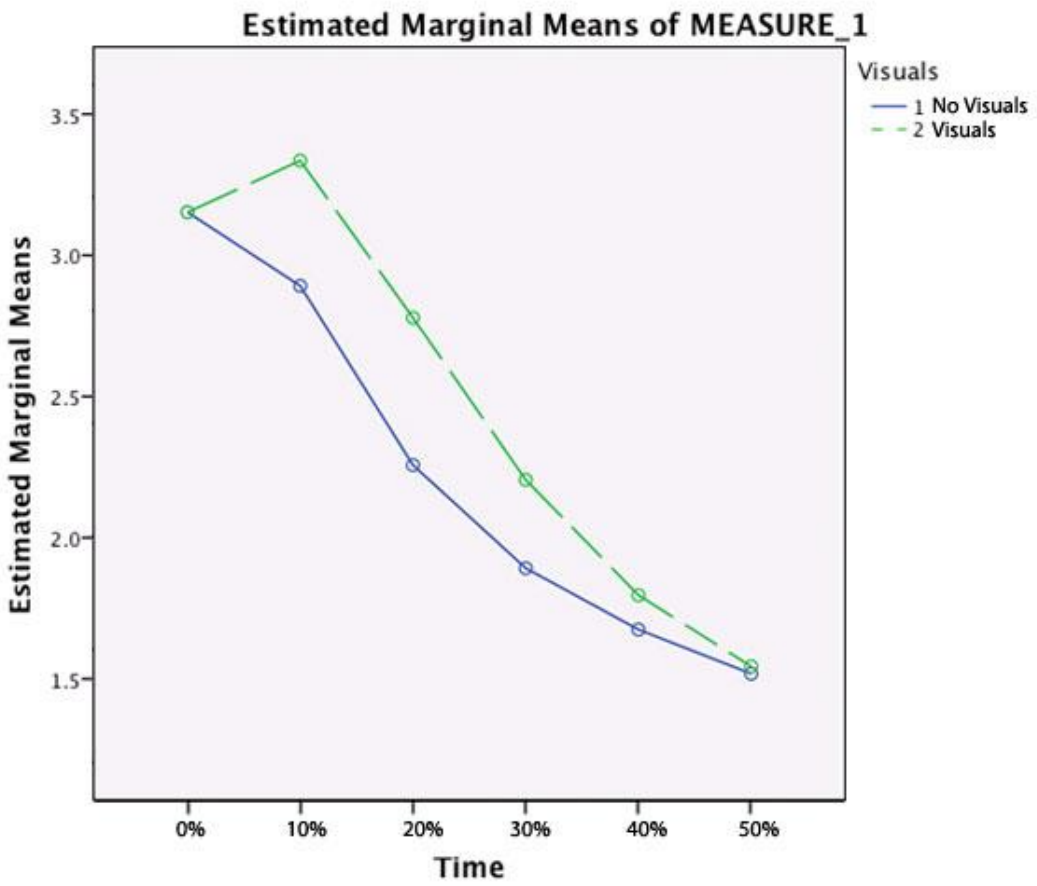

Figure 5: Visual by Time graph for question 5

Discussion

Overall participants most often preferred the visual to the non-visual forms of compression and media. This finding aligns with the multimedia principle. Additionally, the results revealed that learners most often preferred the 0% and 10% compression groups regardless of the activity they would be performing. Preference then sloped downward towards 50% compression. This is partially in line with prior research on time compression (Pastore, 2010; Pastore 2012), which shows that participants learning starts to significantly decrease after 25% compression speeds. Although participants could listen to faster speeds and still learn, they enjoy slower speeds, which are still faster than normal pace.

Question 1 - How much would you prefer this speed when listening to content for entertainment/personal purposes?

The interaction between visuals and no visuals indicated that participants preferred no visuals at 0% more than with visuals at 0%. However at 10%, they preferred visuals more than anything. At 20% compression the results decreased for both visual and no visual variations. As a result, it can be concluded that when given the chance to compress speech themselves, students will more than likely compress content that they are listening to for entertainment purposes to around 10% compression regardless of visual presentation.

Question 2 - How much would you prefer this speed for instruction and/or learning?

Participants preferred the visuals at 0% and 10% compression the most, then preference drastically decreased. When presented no visuals, participants preferred the 0% compression speed then that preference steadily declined to 50%. Given these results, it appears that when professors or students are compressing instruction, they need to be careful how much they compress above 0%. Students did indicate they like the instruction compressed, but only up to 10%, which they preferred the most. This is inline with Pastore (2010) who found that participants could learn effectively at 0% or 25% with visuals but when visuals were taken away, that was diminished and learning needed to stay at 0%. As a result, if instructors (or instructional designers) are going to present content for learning, they should use visuals and not compress more than 10%.

Question 3 - How much would you prefer this speed for a review of a classroom lecture that you have already heard?

Overall, participants preferred to listen to content with visuals, compressed at 10% more than any other speed. This is in line with Pastore (2010), who indicates that when compressed, visual must be present in order for learning to remain constant. It should be noted that learners preferred the 0% and 10% compression groups for the no visual variation more than regular speed with visuals.

Question 4 - How much would you prefer this speed for an audio book being read for entertainment?

Participants preferred the 10% group with visuals out of all options. This finding is interesting as most books do not contain images. However, media such as magazines, newspapers, blogs, and websites do usually contain both images and text, which is more inline with the multimedia principle (Mayer, 2005) and what participants might be reading for entertainment purposes. This preference for multimedia should be explored further to see what forms of multimedia learners prefer.

Question 5 - How much would you prefer this speed for an audio book being read for educational purposes?

Participants preferred a speed of 10% with visuals. At 0% compression, participants' preference for visuals or no visuals did not differ. At 20%, preference decreased rapidly. This indicates that if students or professors plan to compress any text book (audio version), they should not compress unless they also have visuals that explain for the text. Pastore (2010) indicates that learning will not stay constant unless there are visuals. This finding will make it more difficult to justify compressing an audio books as most do not contain visuals unless they were designed with multimedia in mind.

Conclusion

The purpose of this research study was to explore learners' perceptions of time-compressed speech in order to help determine at what speeds they would prefer speech to be when listening (and viewing) for entertainment and learning purposes. Prior research has shown that learners can compress speed up to around 25%, when presented with visuals, and still retain high-level knowledge. As a result it was expected that learners would prefer speeds around this rate (20% to 30%).

Results of the research revealed that participants for all of the questions/scenarios preferred the visual to the non-visual groups. This was not surprising given that it is better to learn from a combination of words and visuals than it is from words alone (multimedia principle) (Mayer, 2005; Mousavi, Low, and Sweller,1995). The implications of these results dictate that if students

want to compress multimedia, they can do so up to 25% and still retain high level learning, however, more than likely they will not compress much more than 10%. This is good news for instructors that are wary of this technology. They do not need to worry about students compressing on their own because they will most often not compress more than 10%. If instructors or instructional designers intend to compress a lecture, text, or other media for learning, they should not compress over 10% otherwise learners might not enjoy the presentation, even though learning is not inhibited when compression is 25%. The downfall to this is that reading is still much faster. While compressing at 10% will give a 10% time savings, which could be significant if multiplied many times in hours or dollars when comparing to regular speed, it is not the same return on investment that text will provide. Thus text might be a better medium when time is a concern even though the modality principle demonstrates that audio is a better option when controlling for cognitive load.

Future research on time-compression should focus on examining the qualitative aspects of students' perceptions. What is their experience when listening to compressed speech? If they were taught to compress, would they? Why do they prefer the speeds they do? Also, looking at time-compression on various forms of media, for instance, animations and video. Do the results hold for these media types or do they change? Additionally examining student learning by time could have major impacts on the current recommendations for time compression. Current research on time compression has not examined content that takes longer than 20 minutes to listen to in its normal-paced state (Ritzhaupt and Barron, 2008; Pastore, 2010; Pastore, 2012). If learning were to continue to remain constant for instruction that is longer in duration (i.e. 60 minutes), then it could be recommended that all audio be compressed to a degree. It is these questions that will help further the time-compressed literature.

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About the author

Dr. Ray Pastore has multiple years of instructional design experience, which includes extensive corporate, K-12, and higher education experience. He earned his Ph.D. in Instructional Systems with a minor in Educational Psychology from Penn State University in 2009 and is currently an Assistant Professor of Instructional Technology at the University of North Carolina Wilmington. Dr. Pastore's research focuses on multiple representations (multimedia), gaming, mobile learning, and metacognitive strategies that support learning from a multimedia environment.

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Editor's Note: This is a brilliant use of new technologies to extend opportunities for learning. Although this paper is focused on the needs of deaf students, it could be used to solve a great variety of educational and communication needs. Simplicity of production, ease of use, and the ability to store, share, and access by mobile devices from a central repository is especially appealing. It sets the imagination on fire!

Leveraging augmented reality apps to create enhanced learning environments for deaf students

Becky Sue Parton
USA

Abstract

The wide-spread availability of cell phones and tablet computers has given rise to the popularity of Mobile Augmented Reality (MAR) and systems to facilitate those experiences such as Quick Response (QR) codes and Auras. Students who are Deaf and whose primary language is American Sign Language (ASL) may benefit from projects that leverage these technologies. A pilot study was conducted at a residential school for the Deaf to test the feasibility of using Auras in the classroom and to establish best practices for creating them. Based upon that study, the research team designed an augmented field trip for Deaf students to explore at a distance using the same technology. This paper describes the pilot study, the processes for creating Auras, the possible barriers associated with this technique, and provides a look at the resulting fieldtrip guide. Included in the paper is a discussion of the implications for access to materials for special populations by connecting field-trip experiences across the country.

Keywords: augmented reality, deaf, mobile learning, interactive multimedia, assistive technology, instructional technology, QR codes, technology integration, sign language, auras

Background on augmented reality

Anyone who watches science fiction movies has been exposed to futuristic settings where computer data and the real world merge to create a mixed reality environment. Many of those concepts are coming to fruition in schools today. Over the past two decades, researchers and developers have attempted to make a link between the physical world and the digital world through a variety of techniques (Chipman, et al, 2006; Price, 2008). An exhaustive history of such approaches is beyond the scope of this paper, but one area in particular, Augmented Reality, has the potential to impact teaching and learning in significant ways according to the New Media Consortium's Horizon Report (Johnson et al, 2011). Although there are slight variations in terminology, Augmented Reality can be defined most succinctly as a hybrid view of the world where virtual and digital information combine to provide enhanced environments (Brown & Green, 2012; Clemens, Purcell, & Slykhuis, 2013; Latif, 2012; Smith, 2013; Smith & Brown, 2011). More specifically, the widespread availability of cell phones and tablet computers has given rise to the popularity of Mobile Augmented Reality (MAR) in educational settings (Smith, 2013). For the purposes of this discussion, two techniques for creating MAR projects will be discussed: QR Codes and Auras.

QR codes

In recent years, Quick Response (QR) Codes, a type of 2D barcode, have increased in popularity both in pop culture and in educational settings (Law & Simon, 2010). The codes can be placed on anything from magazine pages and billboards to museum displays and toys. Typically, a person takes a photo of the code with a smartphone or tablet and then is directed to web-based multimedia to augment the experience. A wide-variety of educational projects have been developed to leverage this technology including live quest games (OShea, Curry-Corcoran, &

Nichols, 2010), field trips (Hsin-Chih et all, 2013) and training modules (Yuen, Yaoyuneyong, & Johnson, 2011). Some unique integration projects have occurred in the field of assistive technology as well. For example, Bonifacio (2012) integrated QR codes into the periodic table so that visually impaired students would be better able to connect with the material. QR codes have many benefits including the simplicity of creation (O'Shea, Curry-Corcoran, & Nichols, 2010) and the ease of reading the codes with widely available free scanner apps for mobile devices (Parton, Hancock, & Dawson, 2010). Ultimately though the codes may be limiting in that they have to be created and added to the environment in this type of 'marker-based' approach to Augmented Reality.

Auras

While still very popular, QR codes may soon give way to newer technologies that are emerging. The idea that any device with a camera can identify the physical environment and select an augmented layer to enhance it, without any markers, is slowly becoming more practical (Byrne, 2012). Popular apps such as 'Wikitude' allow people to scan buildings and monuments in the real world and see digital data at the same time. One tool for creating and sharing these hybrid experiences is called 'Aurasma'. Mills, as quoted in Edwards (2013, p. 29), says "What's great about this [Aurasma] is the technology is allowing the phone to start to see and understand in much the same way as the human brain". Developers take photos of items that will serve as triggers – for instance, a museum statue, a book page, or a picture. Then that trigger is attached to the related video and uploaded to the server as an Aura. The user points their camera at the real-world object and when a match is detected, the linked digital content automatically starts. For example, the AMC movie chain recently deployed an app using this technology that lets people scan a movie poster and automatically see the trailer.

There are numerous educational applications for this type of augmented reality in which real world environments are enhanced by virtual imagery (Clemens, Purcell, & Slykhuls, 2013; Robinson & Coltz, 2013). For example, Latif (2012) piloted a project in the health care area using auras to enhance medical training scenarios. Other researchers have focused on the benefits of having students create auras. Smith (2013) initiated an immersive poster session for undergraduates at his college. He reported that students were able to create the auras themselves successfully and perceived the process to be worthwhile. However, he did note that the auras often became a distraction to the actual presentation topics since many observers wanted to know more about the process (Smith, 2013). While Robinson and Coltz (2013) did caution against choosing a technology only because it is 'new and cool', they also reported on the benefits of using auras to actively engage learners and increase retention. Only a limited number of studies have been conducted using this approach to MAR, but those that exists point to a potential powerful tool for education.

Augmented reality projects in deaf education

Students who are Deaf and whose primary language is American Sign Language (ASL) are in a position to benefit from augmented reality. ASL is the primary language for most Deaf adults in the United States and is often referred to as the natural language of the Deaf (Singleton & Tittle, 2000). Therefore, it is often a desired result to augment oral or written English information by providing videos shown in ASL. As part of a federal grant, this researcher previously co-created a traditional storybook for Deaf children, *Lambert's Colorful World*, that linked to multimedia components via radio frequency identification (RFID) technologies (Parton & Hancock, 2011). Using a RFID scanner attached to a laptop, the children were able to scan the RFID tag and see an ASL video version of that page of the story. Although effective and engaging, the expense and necessity of the specialized RFID reader and tags was a negative factor. Therefore it was decided that another approach might have better long-term benefits.

Thus the research team decided to pilot the use of Aurasma to facilitate the augmented reality experience in connection with storybooks. Each of the pages were photographed and connected to the previously created ASL videos using the Aurasma development toolkit. A small group of kindergarten children in a residential school for the Deaf were then given iPhones and iPads with the auras pre-loaded. The researchers demonstrated the activation of the first book page and the children were able to quickly transfer that process to the rest of the pages. Figure 1 is a photo of a child using the system - when clicked it will take you to a video clip shot during the pilot study observation. (It can also be found at http://youtu.be/NSs0gop1Zvw .)

Figure 1: Lambert's Colorful World via Aurasma

The purpose of this initial pilot was to determine the feasibility of using Aurasma and to establish best practices for creating the auras. Through an interview session with the participating teacher, the researchers realized that a better design would have been to utilize the full screen space for the ASL video rather than incorporating the page image into the edited video. Although the iPhone was able to display the auras, it was not easy for the young children to manipulate – the bigger screen of the iPad, although a little heavier to hold up, was preferred. While the kids could use the legacy RFID-based approach anywhere, one significant constraint to the Aurasma system was the necessity of an internet connection. For this pilot observation, the auras were also pre-loaded, so the students did not need to join a channel to gain access to the virtual content. Based upon that positive experience, the research team moved forward with plans to convert an augmented field trip for Deaf students from a QR-based experience to an Aurasma-based experience.

Augmented fieldtrips – the Tiger Creek project

An animal sanctuary in Texas, Tiger Creek Wildlife Refuge, served as the fieldtrip destination since a group of Deaf high school students had previously visited and the owners were willing to accommodate research studies. A brief look at the first approach taken by the research team to create an augmented experience at the refuge is important in light of the overall discussion. Originally, that approach was to use QR codes to facilitate the augmented reality process. Information on the background of each tiger (or big cat) was obtained. Each of the tigers' stories were then translated into ASL and a corresponding video was created. Using a free tool called Kaywa (https://qrcode.kaywa.com/), a QR code was then created for each tiger's video. The

issue of displaying the QR codes at the sanctuary became an unexpected issue. Although it was intended for the codes to be placed behind Plexiglas directly on the gates to the habitats, that plan did not work. The owners explained that they often switched the tigers into different habitats so that each of them could have an opportunity to play in the habitats that had better features such as a pond or a cave. In order to accommodate this situation, guide booklets were printed with all the tiger names, photos, and QR codes. In this manner, a visitor to the sanctuary could potentially obtain a guide, look for the tiger's name that matched the nameplate in front of the habitat, and scan the QR code.

Figure 2 shows a sample excerpt from the guide. The QR code is live so it can be activated once you have a scanner app loaded onto your smart phone or tablet. The entire guide can be found at http://tigercreekasl.wikispaces.com/ No specific study was conducted, but rather the guide was provided to Tiger Creek to make available to any Deaf person who visited.

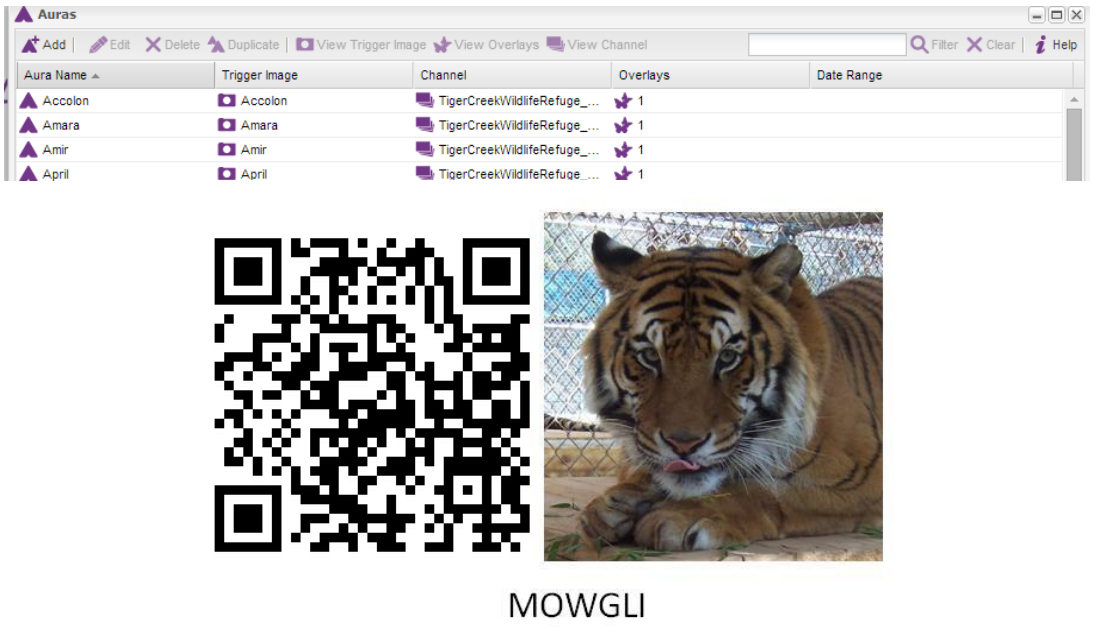

Figure 2: Tiger Creek Wildlife Refuge Sample QR Code

Based upon the potential benefits of using Aurasma as an alternative to facilitating MAR, the Tiger Creek project was re-visited and converted. Since a living animal cannot be used as a trigger, as opposed to an outdoor statute or a display at a museum, the photos of the tigers were selected for this purpose. Compared to creating a QR code, the process to create an aura is slightly more complex, but still straightforward. A developer must create an account on the Aurasma Studio website, upload both the triggers (photos) and the overlays (videos), and then connect them. The resulting auras can then be placed in a channel and shared publically or privately. Figure 3 shows the steps to this process.

To subscribe to the Tiger Creek channel and thus have access to all the auras, one needs to first download the Aurasma app on his/her smart device. Then search for 'Tiger Creek'. When it is located, then the 'follow' button may be selected so that new auras are automatically added.

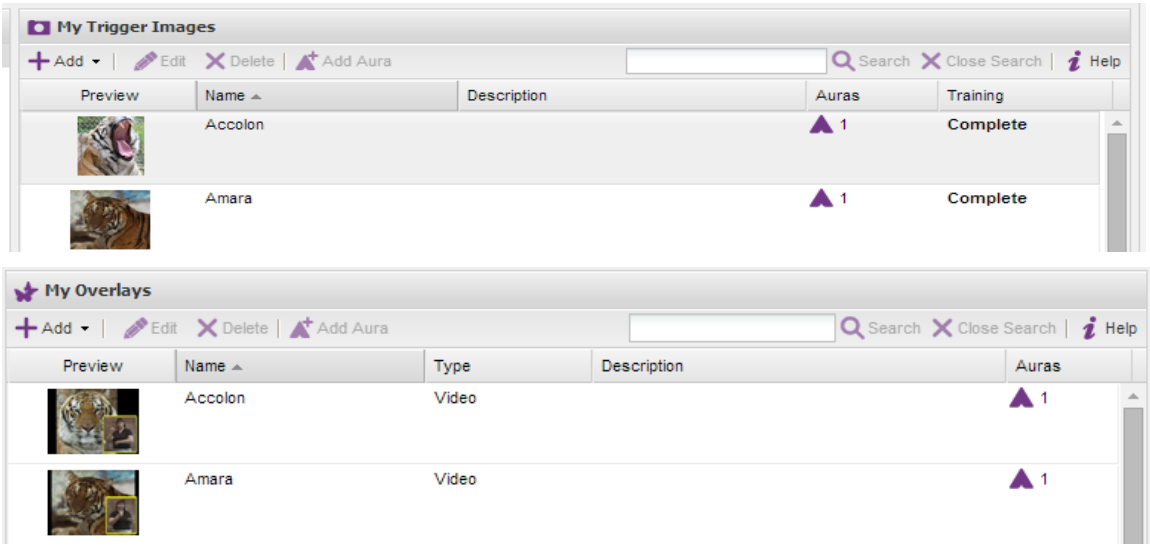

Figure 3: Aurasma Studio Design Process Steps

See figure 4 for screenshots on finding the channel. Alternatively, an invitation to join a channel can be sent via email if, for example, a teacher wanted to quickly have her class follow one. By making it public though, anyone in the world can join the channel and make use of the augmented information. The channel is live and may be tested by scanning the sample tiger photo in Figure 5.

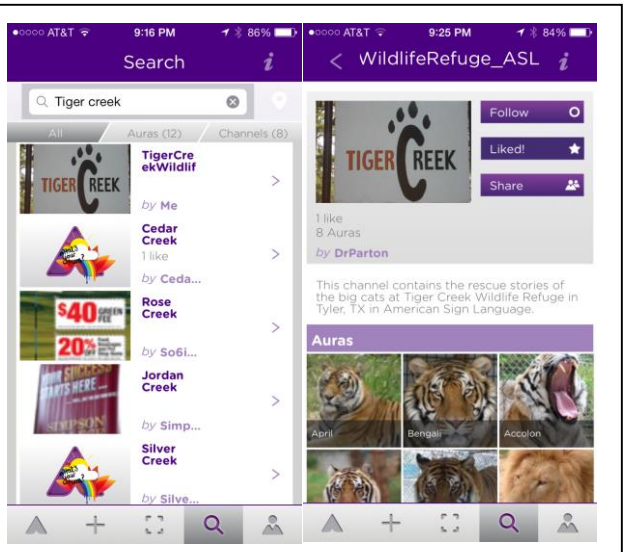

Figure 4: Tiger Creek channel in Aurasma

Figure 5: Gombe scannable image

All 32 big cats have auras – normally one would scan the photos in the guide while in the presence of the actual animal, but for testing purposes the guide with photos can be found at http://tigercreekasl.wikispaces.com/ . One may print the photos to scan or just display them on the computer screen and scan them in that form. One concern that the research team had regarding the conversion to Aurasma was the similarity in the trigger images. Many of the tiger photos are very similar in color and pattern so there was an initial concern that the wrong videos would be triggered. That concern appears to be unfounded though – no incorrect augmentation

occurred through several rounds of testing. Ideally, the photos would be placed on the nameplate signs of the actual habitats rather than provided as a supplemental guide. Again, the guide was given to Tiger Creek to distribute.

Discussion

One reoccurring issue with pilot projects created for research studies is the lack of widespread distribution of the materials that were developed. For example, in the 1980s a collaboration between the Texas School for the Deaf (TSD) and Sea World resulted in a video tape depicting ASL explanations of each featured marine animal. However, other than the students at TSD, hardly anyone viewed that video kit. Thus one of the potential benefits of creating fieldtrip experiences that can be made available through shared mobile media apps, is the increased usage of the content beyond the originally targeted population. Currently, anyone can view the Tiger Creek fieldtrip whether at a distance or in-person. The audience might include Deaf children at other schools across the nation, families with Deaf children on vacation, or other interested individuals.

Although this augmented fieldtrip was created by the author, the tools to create future fieldtrips are user-friendly thus making it possible for tech savvy teachers and parents to create their own Auras based on significant sites and excursions within their community. Deaf students at residential schools often have teachers with excellent signing ability, whether they be Deaf or hearing adults; however, many Deaf students are mainstreamed and their teachers may not have the ability or time to create ASL-based materials. The ability to share augmented reality experiences may facilitate a reduction in isolation and provide strong language models. In addition, older Deaf students who are fluent in ASL might also contribute augmented fieldtrips to a national repository which would serve a dual purpose of engaging them in the development of real-world technology skills and expanding the content offerings available. Thus the incentive for both developers and teachers, along with their students, to create other fieldtrip experiences may increase as the ability to connect with others becomes easier and the project materials can be distributed and accessed without any cost.

Conclusion and future studies

Aurasma essentially removes the ‘middleman’ when it comes to Augmented Reality. A QR Code, or other marker, is no longer needed in order to merge physical and digital experiences. The technique still has some challenges, including the need for internet connection when using a tablet rather than a phone with cell service. For future studies, now that two avenues to experiencing augmented reality (i.e. QR Codes and Auras) are available at Tiger Creek, it would be an interesting follow-up study to see which style visitors prefer along with their perceptions of the experience. In terms of using Aurasma in other situations where augmented reality would be beneficial, further research is needed. When, for example, a user points the camera at a real 3D object rather than a photo or page in a book, is it as easy for the software to recognize it and launch the aura? Some preliminary reports in that regards suggest that the angle of the scan may impact the functionality. Another line of inquiry, as mentioned in the discussion, could be the creation of custom AR projects by students. Is the studio software and process suitable for kids and teens? Would teachers be inclined to contribute to a national repository of augmented fieldtrips or storybooks? Other tools based on similar concepts, such as Aris (http://arisgames.org/) could also be examined for their potential use in teaching and learning. Multiple layering is another aspect of augmented reality that would be interesting to explore. Aurasma allows more than one virtual layer to merge with reality; thus, when scanning a fire truck, one might see both a video about fire safety and at the same time see animated flames surrounding the truck. Does cognitive overload occur at some point? Are there future

technologies that are emerging, such as Google Glass, that may take Augmented Reality a step further and be available in educational settings? Even with the questions, Johnson (2011) calls Augmented Reality a 'game changer' and that may be especially true for Deaf students.

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Editor' Note: Attempts to use distance learning to reduce cost have been opposed by faculty in many western universities, but in underdeveloped countries it may be the only way to supply educational programs to satisfy student demand, and to support economic development. This paper deals with many issues related to successful implementation of distance learning, the potential benefits for learners and the nation.

An expose on the gains and challenges of the open university system in Nigeria: a writer's panacea

Justus A. Sokefun and Temi Taiwo Apena
Nigeria

Abstract

The need to make education affordable and accessible to applicants who could not be admitted by the conventional institutions of learning throughout the country, particularly the working class, necessitated the re-establishment of the National Open University of Nigeria. This gesture has been beneficial to many people including those who left school prematurely (drop-out, moved away, or economic necessity). It gives them the opportunity to mainstream back and achieve their aims in life, get certificated and restore their self-esteem. It is against this background that this paper has sought to trace the advent of the Open University into Nigeria and gives an expose of the various advantages and challenges facing the Open University System in Nigeria. In doing this, a questionnaire named (ACOUSN) was developed to ascertain the existence of the phenomenon in question. Two centres of the institution and two conventional institutions were chosen from the western region of the country. One hundred students were selected from each of the centres to make a total of four hundred. Three research questions and three hypotheses were formulated; t-test was used to test the hypotheses. Possible solutions are proffered and recommendations are made at the end of the study.

Keywords: Open University, National Open University of Nigeria, professional agencies, tertiary education, federal government, infrastructure, study centre, learner, facilitation.

Introduction

The Open University is not a particularly recent phenomenon in Nigeria. Having made its first appearance in 1983, it can be easily asserted that by now, a near perfect Open University should have evolved. The Open University system has advantages. As with any phenomenon, the Open University system in Nigeria has been faced with challenges which, put together, and have stultified its growth and development.

It is these advantages and challenges that this paper intends to address. The Open University in Nigeria was created to satisfy the request for tertiary education in Nigeria. As far back as 1976, it was clear to the Federal Government of Nigeria that vacancies for admission were less than the growing number of applicants into the universities. In other words, there was decreasing access to tertiary education. This led to setting up a committee by the Federal Government of Nigeria to advice on the creation of an Open University. After consideration by various regimes, the National Open University was created by an enabling Act of the National Assembly of Nigeria on the 20th April, 1983.

The coup d'état of 31st December, 1983 brought in a military government which suspended the National Open University on the 25th April, 1984. For upwards of eighteen years, that university remained suspended but in 2002, the government of President Olusegun Obasanjo resuscitated the university under the new but identical nomenclature of the National Open University of Nigeria. This marked the second era of the Open University system in Nigeria.

Gains of the Open University system in Nigeria.

Indeed the most important advantage derived from the Open University system in Nigeria is the creation of more spaces for applicants who are in need of tertiary education. With the existing statistics, almost 7.5million students applied for places in the Nigerian universities. It has been found that the existing public and private universities, in view of their capacities and infrastructure, could not cope with this request.

Table 1 shows the number of universities, applicants and admitted candidates as well as the left over between 1999-2009.

Table 1
Number of universities, applicants and admitted candidates 1999-2009.

Year	No of Universities	No of Applicants	No. Admitted	Left Over
1999/2000	45	417,773	78,550	339,223
2000 / 200 1	46	467,490	50,277	417,213
2001/2002	52	550,399	60,718	544,321
2002/2003	53	994,380	51,845	942,535
2003/2004	54	1,046,950	105,157	941,793
2004/2005	56	841,878	122,492	719,386
2005/2006	75	916,371	N/A	N/A
2006/2007	76	803,472	123,626	679,846
2007/2008	94	1,054,053	194,521	859,532
2008/2009	95	1,182,381	N/A	N/A

Suggested ways of increasing access to tertiary education included multiplying the current admission by ten and expanding the number of universities by ten (Munzali, 2000). In both cases, it was clear that the Federal Government of Nigeria could not cope with the enormous financial implications. Even if the government could, the germaine issue would be how to recruit the academic staff and facilities to satisfy such institutions. The ultimate panacea to this was to place reliance on Open and Distance Learning. This university will absorb the applications who, for one reason or the other, cannot gain access to the conventional universities (Jegede 2000).

Ancillary to the above is the fact that students so admitted can take the unique advantage of an Open University to keep their jobs as well as their families while using the system to add value to their lives. In this context, their tenure of employment is not affected by the pursuit of their studies. Indeed, such students in this situation appear to have a psycho-mental balance to successfully pursue their course of studies. Such learners have the option of taking courses at their own pace and location. This, on its own, fuels the spirit of self-reliance and self-dependence (Tenebe 2010).

Another advantage of the system in reference is its openness to all facets of educational background. An Open University, by its very nature, takes care of all prospective candidates, irrespective of their academic background (Anderson, Benjamin & Fuss 1998). In this respect, one" important factor that distinguishes the Open University from the conventional university is

that the doors are open to all candidates for admission and programmes are designed taking cognizance of the interests of various groups of persons despite their deficiencies. Candidates who are not admitted programmes of their interest due to admission criteria deficiency for are admitted into other programmes based on their age, work experience and qualifications (Ajadi 2010).

In this respect, the Centre for Lifelong Learning plays a special role. This centre makes provision for proficiency, certificate and diploma courses. It provides training and retraining, long-term and short-term courses, refresher courses for institutions, corporate organizations and all those in gainful employment who may wish to improve themselves in one way or the other (NOUN, 2006). Table 2 shows the various courses for Proficiency Certificate, Certificate and Diploma Programmes.

Table 2
Courses for Proficiency Certificate, Certificate and Diploma Programmes

Programmes	Programme description
Proficiency Certificate	Beauty Care and Modelling
	Beauty Therapy
	Bio Technology (Beekeeping, snail, mushroom rearing, etc)
	Call Centre Skills
	Cell Phone Repair
	Seed Science and Agro-Based Food Technology
Certificate Programmes	Computer Literacy
	Denial Office Practice
	Entrepreneurship/Small Business Management
	Small Business Management (Financial Management)
	Medical Office Practice
	Secretarial Studies
Diploma Programmes	Business Communication
	Computer Literacy Office Practice
	Entrepreneurship/Small Business Management
	Small Business Management (Financial Management)
	Legal Secretarial Studies
	Marketing
	Medical Office Practice
	Secretarial Studies

The programmes exhibit an advantage to migrant and nomadic persons as well as artisans who, by the nature of their employment, are itinerant. With the insurgence of militant groups like the Boko Haram and the Niger Delta Groups, persuasion by the Federal Ministry of Education could direct their attention to pursuing courses in this centre to gainfully engage them and allow them to channel their energy towards constructive and developmental goals.

Another advantage of the Open University in Nigeria is the creation of Study Centres. This is an advantage with multifarious heads. Firstly, it brings tertiary education closer to the learners. For instance, a learner could choose his study centre taking into consideration personal circumstances like his residence and place of employment, among other factors. This brings education to interested persons without having to travel far distances.

An advantage of the study centre is the creation of employment in the state where the centre is located. This may be latent, but it has its own peculiar way of developing the state and the locality. The establishment of the community study centre by the National Open University of Nigeria has brought education closer to the rural population. So far, there are three such centres in Nigeria. In each of these centres, the local community is allowed to have an input into its establishment and, as compensation for this, the community provides some of the labour force.

The resultant effect of the establishment of the National Open University of Nigeria is that, women in purdah can now have access to quality education through access to study materials and on-line examinations (Osuman, 2010).

The fourth advantage of the Open University in Nigeria is the appreciation and use of new learning techniques in education by the learners. In this context, the use of new technological modes of learning is in reference. These include, but are not limited to, video conferencing, on-line instruction and examination, computer assisted teaching, webcam, digital camera and learning management systems among others.

This has the superlative effect of launching the learners into web based information and its exploitation for national development and capacity building.

Challenges of the open university in Nigeria

The National Open University of Nigeria remains the only Open University in Nigeria. After its establishment in 2002, the federal and state governments have established 32 more universities and licences had been given for establishment of thirty five private universities. For the fact that an Open University is a specialized institution, it would be imagined that both the federal and state governments on one hand and private investors on the other hand would be interested in considering entrepreneurship in an Open University. The reverse is the case.

As noted earlier, the Open University is a fairly recent phenomenon in the educational system of Nigeria. For this reason, it is expected that there would be challenges posed at the Open University system which may mitigate against its development.

The next segment of this paper is intended to outline and discuss some of these challenges and where possible, the preferred solutions.

Shift of Paradigm

It is imperative in discussing the first and perhaps most potent challenge of the Open University in Nigeria to take a brief look at University education in Nigeria.

This, it is hoped, will provide a debonair insight into this challenge. The first similitude of a university in Nigeria was the University College, Ibadan established in 1948. It later became known as the University of Ibadan (Fafunwa, B. 1971). After this, the following universities were established in quick succession: University of Ife (now known as Obafemi Awolowo University), University of Nigeria, Nsukka, Ahmadu Bcllo University, Zaria and University of Lagos. Between 1948 and 2002 when the National Open University of Nigeria came into the educational system in Nigeria, not less than 60 public universities owned by the federal and state governments were established. This spanned a period of 54 years.

By this calculation, for a period of 54 years, the educational system and the populace were used to conventional university education. This is, without prejudice to the Centres of Distance

Learning, operated by universities like Ahmadu Bello University, University of Lagos, University of Ibadan and more recently, University of Abuja.

The new learning modes that go with the Open University was a shift of paradigm. This shift from the usual to the unusual and virtually unknown is the first and most potent challenge to the Open University in Nigeria. In point, of fact, the new learning modes create some skepticism in the populace in the value and quality of the qualifications received from the Open University. This situation is exacerbated by individuals who challenged the usefulness of the new system in national development. This threat to the Open University caused it to become defensive whereupon the less superior arguments of the challengers assumed a position of superiority over the Open University's superior but mute arguments (Jegede, 2011).

The solution to these challenges is for the University to undertake awareness programmes using the experience of foreign Open Universities like those in the U.K., Australia and Hongkong as their focus. With this approach, it will be clear that notwithstanding the learning mode and the general modus operandi of the Open University System, the qualifications obtained there are not inferior to those of the conventional universities.

Facilitation and learners

Admittedly, the learners are part of the populace who would need to be convinced about the quality of qualifications obtained from the Open University. Learners also pose the challenge to the use of new technological means of learning. In this respect, a learner who never used the computer or the web to learn as a secondary school student may find it difficult to use them having got used to the conventional manual and outdated system.

Learning for such a learner will be slow and uphill task. At the same time, facilitation for him may produce negative effects as he would be used to the normal teaching and probably the physical contact with the teacher.

The argument against the Learner goes for the facilitator as well. It has been suggested that professors do not properly use technology (Valentine, 2002). In this situation, imparting knowledge to a learner who is a technological neophyte may be difficult and probably impossible. The challenge therefore becomes double edged, the one on the facilitator/professor carrying more weight as he is the one to give the orientation to the learner on the new mode of instruction. Where such facilitator fails to do this, he negates the very nature of the Open University system which is the freedom of choice as to the mode of instruction by the learner.

The solution to this challenge may not be too difficult. First, the institution should provide all means of technological instruction to both the learner and the facilitator. In this respect, it noteworthy that the National Open University of Nigeria has embarked on 'a computer for each learner' programme. With regard to the facilitator, the same should apply. This should be followed by a comprehensive orientation course followed by regular refresher courses for both facilitators and learners.

In doing this, the institution confronts, albeit headlong, the challenge posed on both the learner and the facilitator in the use of new technological modes in the delivery of instruction.

Quality of course materials and programmes

The most overt means of measuring an institution is the quality of its materials and programmes. These two have immense effects on the quality of the graduates turned out of the institution.

The challenge posed to the Open University in this respect is the availability of authors who would provide course materials and develop internationally acceptable programmes.

In the light of the shortage of academics in Nigeria and the workload on the few willing persons, receiving well researched and qualitative course materials may be an uphill task. Adherence to

the curriculum by such authors might also be a major challenge. The effect, from experience, is that programmes exist with students enrolled where there are no course materials.

One way out of this quagmire is for the recruitment of authors by the university for short periods, for instance, for three months. Their main duty would be to produce course materials for their programmes and get them edited within the same period.

To accelerate the final production of these course materials, the Department of Instructional Resource and Material Development should be well funded by the institution for which reason, the staff should be committed and dedicated to the duty of producing first class course materials for the university.

Copyright matters

Ancillary to the above is the issue of copyright. The copyright of the Course Material Developer in the material is still nebulous. Indeed, once the writer submits to the university and he is paid, all rights in the work belong to the university.

On the contrary, the economic principle in copyright protection is based on the fact that a person is entitled to the yields derived from the work of his hands after expending his skill, labour, time and money (Sokefun, 2001).

In Nigeria as in other parts of the world, copyright is granted by law and the sanctions for the breach of any of the provisions relating to the right are enforceable under the law (Fretias, 2001). With this arrangement, it is necessary for authors to continuously take a percentage on each of the course materials written by them. The effects of these are manifold but most important. Firstly, the author that is paid an annual percentage will be more committed in the writing a qualitative course material. Secondly, in terms of liability for plagiarism and other torts, the author who continuously takes pecuniary compensation for his course material will be jointly liable with the institution in the event of litigation.

The current practice of making a one-off payment to the Course Material Writer is akin to exploitation that may discourage original course materials.

In this event, the solution lies in the production of standard form agreements between the authors arid the university. The agreement should contain provisions on "fair use" by which the Writer could reasonably use some of the contents of the material in his future research. The guide as to the extent of "use" is to be found in Lord Denning's dictum in Hubbard V Vosper. It is here quoted *ipssissima verba*:

> "You must consider the number and extent of the quotations and extract ... To take long extracts and attach short comments, may be unfair, but short extract and long comments may be fair".

Another clause that should feature in the agreement is the annual honorarium clause. Such a clause will continuously place a burden on the author in case of litigation.

Attitude of professional agencies

In this respect, particular reference is being made to professional regulatory bodies like the Nigerian Medical Association, Council of Legal Education, Nigeria Institute of Architects, Nigeria Nursing Council and others.

In apparent ignorance of the *modus operandi* of the Open University system, these regulatory bodies have been wary to accept the relevant programmes of the university. The reasons vary from one discipline to the other. For instance, in the case of the Council of Legal Education in Nigeria, the Council frowns at the mode of delivery of instruction for Law at the National Open University. As for the Nursing Council, they prefer a situation where they would accredit the Nursing Programme of the institution.

Regarding this challenge, the most potent solution is to interact with the bodies with a view to harmonizing their programmes in the university with the enabling Acts of such bodies.

Internet connectivity, procurement and maintenance

In view of the high cost of internet connectivity, procurement and maintenance, it is difficult for learners to have easy access to the internet. While it costs $0.52 per kilobyte in North Africa and even less in Europe, it costs at least N150 ($0.50) per hour to connect to the internet in Nigeria. This excludes poor service and slow server response at the cyber cafes.

It is suggested that the university should build the cost of a laptop and an internet modem into the school fees of the student. In order to encourage the student, the period of payment may span through the duration of the programme of the learner. In this event, the learner has a constant companion in the laptop with the effect of getting used to it in the course of time.

Funding

There is the question of funding of the Open University by the Federal Government. It is noteworthy that there is only one Open University in Nigeria. For this reason, the federal government is expected to make funds available for its growth and development in order to make it viable and to be able to compete effectively with its equals in other parts of the world.

Literature review

The Open University System is gradually finding its feet though not without some teething problems like shortage of manpower, non-availability of course materials, inadequate supply of computers, over population in some centres, to mention just a few. Chang (1983) enumerated lots of flexibility, no commuting, numerous choices for schools, lower costs and learning while working as the benefits of the open learning system. He also highlighted among others: lack of social interaction, occasional internet provider downtime, support for learners leading to isolation and possible non-completion of programmes among other factors. As the disadvantages of the open learning system, Aderinoye and Ojokheta (2004) in Ojo O. and Olakulehin K. (2006) relate the benefits and demerits of the open learning system with that of continuing education in the sense that it mainstream people back into their desired career in order to fulfil their life ambition. Ojo and Olakulehin also stated that the arrival of the National Open University of Nigeria gave credence to awareness for the acceptance of distance education in Nigeria.

Statement of the problem

Nigeria is a country with a very large population. Its many institutions do not have capacity to absorb all the available applicants aspiring to obtain higher degrees. As a result of this, open distance education was re-introduced. The aim was also to reach the disadvantaged group like the nomads, women in Pudah, and fishermen, to mention a few. The Open University is also established to remediate the problems of the ‘out of school’, give opportunity to those who want to have additional qualification and those who are gainfully employed, and help individuals to achieve their ambition in life. This paper examines the advantages and challenges facing the Open University system in Nigeria.

Objectives

This paper will:

Trace the origins and history of the Open University into Nigeria

Give descriptions and interpretations of the various advantages and challenges facing the Open University System in Nigeria.

Research questions

What informed the establishment of the Open University System Nigeria?

How beneficial is the Open University System to the Nigerian society?

What are the issues in the Open University System in Nigeria?

Hypotheses

Ho1: There will be no significant difference between the products of the Open University System and their counterpart in the Conventional system.

Ho2: There will be no significant difference between the products of the Open University student who are employed and those who are not employed.

Ho3: There will be no significant difference between the products of the Conventional Universities who are employed and those who are not employed.

Methodology

A descriptive survey research design was adopted for the study. A questionnaire was developed to elicit information from the respondents to study attitudes, beliefs and behaviours. It is also easy to administer. The questionnaire named (ACOUSN) was developed to ascertain the existence of the phenomenon in question. Five centres of the institution were chosen from the western region of the country, thirty students were selected from each of the centres to make a total of one hundred and fifty. Three research questions and two hypotheses were formulated; t-test was also used to test the hypotheses.

Procedure and data analysis

The instrument was administered on the 150 students. The item of the instrument was scored after completion and analyzed using t-test statistics.

Results and Findings

Result generated from the instrument is presented in the Table1.

Table1

Independent t-test analysis of the mean and standard deviation of students of the National Open University of Nigeria and students of traditional universities.

Group	N	X	S.D	t-cal	t-tab	P
NOUN Students	186	36.41	6.77	18.11	1.96	0.05
Conventional. Univ. Students	214	25.24	5.54			

P<0.05 df =398

Research hypothesis one which states that there will be no significant difference between the products of the Open University System and those from the Conventional System is hereby rejected. This is because the t observed of 18.11 is greater than the t table value of 1.96 at 0.05 level of significance. This shows that there is significant difference between the two phenomenon under observation.

Research hypothesis two was also tested using t-test statistics and the result is as presented in Table 2.

Table 2
t-test analysis of the mean and standard deviation of students of NOUN who are employed and those who are not employed

Groups	N	X	S.D	t-cal	t-tab
Employed NOUN Students	105	36.80	7.05	0.897	1.96
Unemployed NOUN Students	81	35.90	6.41		

P <0.05

Research hypothesis two which says that there will be no significant employment difference between both employed and unemployed students of NOUN is hereby accepted. This is because the value calculated is 0.0897 at p<05; hence there is no significant employment difference in the performances of the two categories.

Research hypothesis three states that there will be no significant difference between employed and unemployed students of the Conventional System.

Table 3
t-test analysis of the Mean and Standard Deviation of employed and unemployed students of the Conventional System.

Groups	N	X	S.D	t-cal	t-tab
Employed Con. S. Students	127	26.20	5.492	2.10	1.96
Unemployed Con. S. Students	87	24.58	5.514		

P<0.05 df =212

Table 3 shows the value of t calculated to be 2.10 which is greater than the table value of 1.96. Hypothesis three is therefore rejected; showing that there is significant difference between the performance of the employed and that of the unemployed. The mathematics mean score of the employed =26.20 and is higher than the mean score of 24.58 for the unemployed.

Conclusion

If Nigeria is to be seen to be committed to the development of the Open University System, the discussed challenges should be seriously addressed. The advantages of the Open University system through this approach will be harnessed and maximally utilized.

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Editor's Note: Instructional design is a discipline that is little understood, even within the field of education. Its roots are in instructional technology, social sciences, and communication. It integrates a huge volume of theory, research and best practices from these disciplines with personal sensitivity to learner needs and interests, and creative skills in writing, graphics, and interactive multimedia. This insightful article goes far beyond an analysis of "What is instructional design?" It looks at the politics, economics, and tensions within educational institutions that diminish its role and effectiveness.

Sifting through muddy waters: A critical look at contemporary instructional design

Nirupama Akella
USA

Abstract

The future of instructional design looks bleak as the discipline and profession struggle to clearly define their scope and purpose. Against the theoretical background of the post-modernistic philosophy, this discussive paper maps the challenges faced by contemporary higher educational institutions. The paper also details a few viable solutions which can be implemented to accord instructional design its due recognition and value.

Keywords: instructional design; learning; post-modernism; project management; science; instructional technology

Introduction

"How to help people learn better," (Reigeluth, 1999, ix). This brief statement sums up the goals and mission of curriculum development, and learning design. This paper focuses on a critical aspect of learning design and development that is instructional design. The author argues that the field seems to have lost value and meaning. The position paper based on the underlying world philosophy of post modernism, deconstructs the logic and meaning of instructional design. The author states that instructional design and designers have meandered from their original goal of improving student learning, embracing rigid policies and structural consistencies to select poor but cost-effective instruction. The paper is divided into four sections. The first section scrutinizes the philosophy of postmodernism, and the true meaning of instructional design. The second section of this paper focuses on the challenges faced by contemporary instructional design, namely lack of awareness of the nature of instructional design, and the impact/ influence of university infrastructure. The final concluding section discusses and debates the future of instructional design.

Section 1: Postmodernism and instructional design

Postmodernism is rooted in the orientation of interpretation, as opposed to the scientific philosophy of prediction and control (Wilson, 1997). Postmodernism holds that truth and knowledge ought to be left open for individual interpretation. Hence, it states that every person can have one interpretation of truth. This truth is supplemented by a body of personal knowledge and experiences. Thus, every schema is unique and individualistic. This perspective is supplemented by a belief of respect, acceptance, and collaboration (Wilson, 1997). People respect, accept, and collaborate to piece together individual schemas to make it a whole comprehensive truth. The characteristics of postmodernism are:

1. A commitment to plurality of perspectives, meanings, methods, values—in short, truth
2. A search and appreciation of double meanings and alternative interpretations
3. A questioning and analytical attitude

4. An awareness of different perspectives and interpretations and an effort to accept them (Hlyneka and Yeaman, 1992).

Instructional design lends itself to postmodern philosophy as it puts the individual over the institution and procedure (Wilson, 1997).

Table 1
Postmodernism and Instructional Design (Wilson, 1997: 8)

Postmodernism	Instructional Design Theory
Knowledge is constructed by people and groups of people	Mind is real. Mental events are worth learning.
Reality is multi-perspectival	Knowledge is dynamic.
Truth is grounded in everyday reality and social situations	Meaning is constructed
Life is a text; thinking is an interpretative act	Learning is a natural consequence of performing
Facts and values are inseparable	Reflection and abstraction; articulation and personalization are key to learning
Science and all human activities are value-laden	Problem solving is critical to learning
	Thinking and perception are inseparable

Instructional design has always been described as an ambiguous discipline; open to varied interpretations and meanings (Wilson, 1997). This means that instructional design is theoretical as well as practical. The postmodern theory and philosophy of instructional allows for:

1. Break the rules and look beyond traditional clichés
2. It would place principles over procedures and people over principles
3. Include all interested parties in the design and development process (Wilson, 1997).

This would mean a needs analysis where the gap and the receivers of learning are analyzed. This becomes essential to design efficient and effective learning. Activities of creating learning objectives, sequencing and chunking of content make the content easy to comprehend and learn. Instructional design moves the content from simple to complex. Assessments are developed within the chunk, not as a stand-alone activity, but as a part of the learning content and activity. Assessments do not mean a battery of tests designed to test the learner of knowledge and skills learnt, but an activity where the learner has the opportunity to explore and articulate his/her view and comprehension. The work of instructional design involves choosing and designing an instructional strategy which would accommodate all learners, and be iterative in nature.

Instructional design is not an end in itself, but a means to an end. It is a tool for helping people who impart learning and receivers of learning (March, 2013). Educational goals and learning should not be sacrificed for adherence to multi-media training and technology. The latter is employed to help design instruction effectively and efficiently. Incorporating and using them in instruction does not constitute the instructional design process. The goals and aims of learners ought to be ultimate focus of all instructional design process (Ng and Bereiter, 1991). In this respect, instructional design has to accommodate and match task-completion goals; learner goals

or personal knowledge-building goals set by learners themselves; and instructional goals set by the institutional system. Hence, instructional design practitioners have to perform ‘’a juggling act’ matching all three diverse set of goals (Ng and Bereiter, 1991). But in all this, the learner has to emerge supreme. All instructional design exists to support learners in their endeavor to learn knowledge and seek truth.

But, to achieve this, instructional design has to clarify its standing within the realm of learning. Instructional designers have to come to the forefront, jump hoops to face the challenges thrown by contemporary higher education system. The following section explores these challenges plaguing the field of contemporary instructional design.

Section II: The Challenges

Lack of Awareness: What is Instructional Design?

People often confuse the terms to be related to something industrial, or something to do with engineering, designing, construction, and crafting. Perhaps they manage to link it with technology, or web programming, and even graphic design (Chapman & Cantrell, 2015). But, instructional design is not related to industry and engineering. The Association of Educational Communications and Technologies [AECT] defines Instructional Design as, “the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning” (Reiser, 2002: 1). Instructional design revolves around learning, and how to make learning more practical, efficient and effective for learners. Instructional designers work with content to make it fit for learner consumption. In a nutshell instructional design is more to do with making sense of learning. Instructional design is concerned with the selection as well as the arrangement of learning matter for effective instruction. The goal of instructional design “is to make learning more efficient, more effective and less difficult,” (Morrison, Ross, Kahlman, and Kemp, 2011). All instructional design is based on the three principles of recursion, reflection, and participation (Willis, 2000).

- The principle of recursion holds that instructional design is not linear, but is iterative like a spiral.
- The principle of reflection states that instructional design follows a process of ‘heuristic development.’ It develops learning content by following a heuristic, rather than a procedure.
- The principle of participation focuses on collaboration and articulation, wherein learning is not viewed as a passive activity but an active process.

Instructional designers, the practitioners of instructional design, are process-oriented who collaborate and function within and across several departments to design the most effective learning sequence and chunk (Waller, 1977). Instructional designers are known as “learning transformers” or “change agents” who embody a sense of ambiguity which allows them to work across various disciplines and departments seamlessly (Waller, 1977). They work on concepts of *creativity, curiosity, communication, and collaboration* (Mahoney, 1988). These four Cs of instructional design ensure that instructional designers are never satisfied and are always seeking to improve/ better learning. “Is there another way to make it easier, more effective for learners?” That is the focal guiding question which shapes the work of instructional design. Instructional designers, thus, are creative, thinking out-of-the-box. They collaborate and communicate with various professionals to design all-encompassive effective learning solutions (Chapman & Cantrell, 2015). This constant collaboration and communication with learning/ instructional technologists, assessment coordinators, subject matter experts, graphic designers, elearning specialists, and educational psychologists, gives the very specialized field of instructional design an ambient color (Branch, 2013).

A good designer has a vast body of academic and practical knowledge of learning theory, instructional technology, evaluations and research design which makes him/her an invaluable decision- making partner in a development project (Branch, 2013). Instructional designers do the following activities of:

- Assessing overall curriculum needs
- Analyzing learners background knowledge and instructional needs
- Determining course goals
- Determining course objectives and the sequence in which to address them
- Developing and implementing instructional content, teaching strategies, and assessments
- Conducting formative and summative course evaluations
  (Chapman & Cantrell, 2015).

Designing learning tasks and solutions make seem easy and doable, but designing effective and efficient learner-oriented tasks is a specialized job function. An instructional designer has to design content to accommodate and achieve a) instructional goals b) learner goals c) institutional standardized goals (Ng and Bereiter, 1991). A Subject-matter-expert (SME) is only concerned with instructional goals, and wrongfully assumes that achievement of instructional goals means achievement of learner and institutional goals. But, this is not the case. The crux is in the fact of "knowing content" and "designing teaching content" (March, 2013). SMEs know the content, but instructional designers know how to convert this content into effective and doable learning tasks and solutions. They know how to convert content into transferable and marketable professional skills (Morrison, et al., 2011). "A SME approaches the design of a course from a content perspective, that is, what to cover. An ID approaches the design of a course by first defining the problem, and then determining what knowledge and skills are needed to solve the instructional problem… hence the focus is on 'needs to know' instead of 'nice to know'" (Morrison, et al, 2011: 2). SMEs are part of the instructional design process- "it is their responsibility to provide accurate information during the task analysis and verify the accuracy of the instructional deliverables" (Morrison et al., 2011: 442). Instructional designers' develop, shape and design learning based on input from SME. SME has to provide the content, and the instructional designer develops and designs the content into learning matter. SMEs can develop courses where learners are passive recipients of the subject content. Instructional designers, on the other hand, know how people learn and can design courses to be learning experiences where the learner is an active participant of the learning process (Morrison, et al, 2011). Specifically, instructional designers perform job functions of:

- Work with SMEs to identify what students need
- Develop objectives and ensure content matches those objectives
- Revise and rewrite content to shape it for learning needs
- Structure content and activities for student learning
- Create media to support learning
  e.g., visual aids, various multimedia for elearning and online
- Develop assessments (this does not mean only tests and quizzes, but can also refer to writing activities)
- Adapt instructional materials to suitable formats and learning management systems (March, 2013).

Unfortunately, contemporary higher educational institutions remain unaware of the precise meaning of instructional design, and the work instructional designers do. Anybody with little knowledge about content and instructional technology is designing courses for learning. Instructional technology is a tool developed to aid instructional design. Instructional technology is not instructional design (Morrison et al., 2011). Instructional designers make use of instructional technological aids to design effective student-oriented learning wherein learners are active recipients and engage in deep learning, and critical thinking.

Instructional Designers perform a wide variety of tasks, from designing training materials, teaching manuals and student guides, to developing full course materials, and/or entire curricula. The multi-media formats they employ can range from operational job-aid materials ranging from simple pamphlets to online tutorials and complex interactive multi-media. The delivery system may vary from face-to-face classroom instruction to internet-based distance education, and/or blended courses. They are student advocates, academic guerrillas, learning professionals (Carl, 1989; Mahoney, 1988).

Sound and effective instructional design is a "linking science: linking theory and practice (Willis, 2009). It is an art and a science based on learning and instructional theory. Instructional design is developmental, non-linear, creative, organic, and flexible. (Willis, 2009). It needs a creative and flexible work environment to flourish and sparkle (Willis, 2009).

The following section elaborates on the above statement highlighting the boundaries imposed on this flexible design process.

Rigid Infrastructure:

Instructional design is rich in diversity and identity (Spector, 2005). Unfortunately, it is held accountable and defined by rigid infrastructural policies and regulations (Spector, 2005). Student needs and learning are by-products of a mechanized design process (Holsombach-Ebner, 2012). Instead, organizational factors such as infrastructure, departmental policies, budgetary constraints, including a cost-effective organizational culture drive the creative process of instructional design (Holsombach-Ebner, 2012). Course design and development have become secondary as accreditation standards, rules and regulations have become paramount. This is adversely impacting student enrollment, learner and faculty motivation levels, and faculty professional development (Holsombach-Ebner, 2012). Such courses which are designed to meet organizational constraints possess less sparkle (Cox, 2009). They are linear, lacking authentic practical learner oriented perspective, technology-driven, and not feasible for collaboration and articulation (Cox, 2003). Instructional design is steeped in the principles of collaboration and articulation (Spector, 2005). It imbibes the two principles in its philosophy, and also propagates them through courses. Courses which allocate prime importance to organizational factors usually are task-oriented courses where the learner is in the background, and department top management is in the forefront (Cox, 2003). Rigid departmental structures can interfere with design and development of learner-oriented courses (Herring, 2002).

Instructional design should be collaborative, pedagogy-driven, and reflective, allowing for evaluations and assessments. Assessments should be inbuilt within the courses enabling seamless integration between content and evaluation (Kenny, Zhang, Schwier, & Campbell, 2005). Assessment ought to help the course designers and developers regarding issues of course learner effectiveness in terms of student learning outcomes, and course technology, authentic tasks, and practicality (Kenny, et al., 2005). It also allows designers in collaboration with SMEs and educational technologists determine effectiveness of existent instructional strategies and instructional technology. Technology is always second to instructional pedagogy and strategy. Likewise, infrastructural procedure ought to be secondary to learner achievement (Kenny, et al., 2005). But this often is not the scenario in higher education institutions. According to a survey

conducted on 142 instructional designers in colleges and universities, 53% of an instructional designer's professional time was spent on organizational tasks (Cox, 2003; Cox & Osguthorpe, 2003). The researchers argued that contemporary instructional designers devote most of their professional time [53%] to tasks of supervision, marketing, and project management. They struggle to maintain their identity as instructional designers, as most of them are relegated to carving courses to suit infrastructural rigid demands and needs. Course design to boost student and teacher morale, learner knowledge and skill, develop learner creativity, articulation, exploration, are no longer important (Cox, 2003).

What has become important and 'the' factor to consider is the efficiency of the course. In order to save time, money, and adhere strictly to the standards of efficiency, student learning is sacrificed (Project Management Institute [PMI], 2009). The time-cost-scope [speed] triple triangle, better known as the 'Iron Triangle' seems to dominate the course development scenario in higher education institutions. The motto now has become 'quicker-faster-cheaper' (PMI, 2009). In this state of affairs, instructional design is losing its sparkle, creativity, and flexibility (Spector, 2005).

The following concluding section discusses the future of instructional design in light of these major challenges.

Section III: Discussion

The future of instructional design looks bleak and uncertain in light of these accentuating circumstances. The solution is a multi-layered complex one requiring extensive critical overhaul of existent education administrative mindsets and environments. It involves revisiting the grassroots and carving a niche for instructional design in an academic bastion. Finally, it means embracing the concept and philosophy of alignment.

The very fact that instructional design is rich in identity and diversity has become a major stumbling block for the discipline, and the profession. People are not aware of what instructional design is, and when an effort is made to educate them; a feeling of disbelief is entertained. This is a common scenario in higher educational institutions, where instructional designers are relegated to job functions and positions of online learning specialists, or Learning Management System [LMS] specialists. But these two descriptions form a part of the instructional design job function. Instructional designers are not SMEs, educational or instructional technologists. Instructional design is concerned with designing courses whereby learners are able to acquire knowledge, and skills which are transferable to the work environment in the future. Instructional designers embrace principles of collaboration, technology, articulation, and needs analysis to design effective, efficient, learner-oriented, creative, and flexible courses. The key words are collaboration i.e. collaboration and negotiation with the content knowledge expert [SME], the educational technologist to use the best possible effective technology, the educational administrator to design courses according to institution standards, and the project manager to design courses in accordance with the institutional budget and allotted timeframe.

As Reigeluth stated, instructional designers strive to help people learn better. They aim to design courses thar propel learners to reflect, experiment, explore, articulate, and synthesize to assimilate and accommodate knowledge and skills to arrive at truth. Such courses are multi -layered, macro in approach, and flexible. They cater to every kind of learner taking help of various perspectives, theories, technologies, and instructional strategies which enable the learner to be in-charge and learn effectively. In tune with post-modernistic philosophy, instructional designers develop courses that offer different interpretations of truth.

Hence, the solution would be to recognize the true meaning of instructional design, and what instructional designers do. It is the backbone of learning, and should be accorded its rightful place, and not be allocated jobs of LMS management, instructional technology, and project

management. These job functions are only one aspect of the job of an instructional designer. Instructional designers don many hats, which are interlinked and relate to effective and efficient course design, implementation, and delivery.

a. Perform Needs Analysis [know your audience]
b. Collaborate with SME, instructional technologist, educational administrator, project manager
c. Write instructional goals, and learning objectives
d. Develop assessment, and evaluation materials [formative and summative evaluations]
e. Course maintenance and improvement based on evaluation and assessment data
f. Research into contemporary instructional design practices [continuous professional development]

Instructional designers are involved with course design, course implementation, course delivery, course evaluation, course maintenance, and course improvement. It is an ongoing process; a linking science which meshes art and science to create effective and efficient courses for student learning.

However, the aim is to create 'quicker, faster, cheaper' courses which are not solely aimed at effective learning. PMI reports have emphatically stated that contemporary higher educational institutions are following the principle of triple cost management. Course design and its principles and process seem to have taken a backseat as project management has come to the forefront. Thus, theory or what is stated as ideal is not being reflected in reality. Learner goals and objectives should be the only ultimate aim of all course development. Everything else is secondary; a by-product (Ng & Bereiter, 1991). But the reverse is becoming the reality in contemporary higher educational institutions. The iron triangle i.e. budget, efficiency, speeds, and mass production of courses like grocery items in the market, has become the aim, relegating student learning as a by-product.

What is needed is alignment—alignment of the iron triangle with student learning. What is needed is a shared vision. Instructional designers must be included in strategic meetings of budget, institutional standardization of policies and goals. Instructional designers can provide valuable input and clearly align institutional, instructional, and learner goals. They can provide feedback as to what works, what will work, and what does and will not. Hence, the solution lies in not confining instructional design to the periphery of strategic planning, but making them a part of the planning process. Instructional designers through their knowledge and acquired information can easily stop higher educational institutions from making costly blunders and mistakes in terms of obsolete, convoluted courses.

Section IV: Conclusion

Everyone cannot be an instructional designer, and develop courses aimed at effective loop learning. Attempts should be made to develop and popularize instructional design as a viable academic discipline, and a profitable profession at the college and university level. Instructional design ought to be popularized as a STEM [science, technology, engineering, math] discipline allowing for greater student enrollments. The field needs more practitioners, researchers, and academicians to grow into a full-fledged visible professional discipline. It needs a niche of its own enabling future graduate instructional design students to demand a place of importance and value in the workplace. A feeling of clarity, recognition, and respect should replace feelings of confusion and ambiguity.

Instructional design needs educational leaders who can shape the future of the discipline and profession. This discussive paper is only a ripple in the ongoing discussion and debate. It only

points the way. Concrete, reliable, and valid research is needed at a large scale to investigate these challenges and solutions.

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Establishing an administrative structure for online programs

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Abstract

The literature dedicated to online education describes and chronicles very well the best practices in online teaching and learning from an instructor and student perspective. What is less well-chronicled, however, is the administrative approach to facilitating and fostering a sustained, strategic, and collaborative support for online education. This paper describes what one academic unit at one institution has done to establish such an administrative structure, the purpose of which is to create a culture of quality, efficiency, effectiveness, collaboration, and student engagement in online programming. Hopefully, similar institutions can apply some of the lessons described here to their particular programs.

Keywords: online education, curriculum development, teaching and learning, administrative structures

Introduction

Over the past 10 or 15 years as online education proliferated and expanded across the landscape of higher education, some institutions adopted the initiative eagerly while other resisted, and continue to resist. Additionally, for those institutions that adopted and integrated online programs and courses, some did so strategically, while others did haphazardly (Raffo, et al, 2015; Bair and Bair, 2011; Bonvillian and Singer, 2013). Those colleges and universities that delivered quality online programs and courses effectively integrated them into existing curricula or created new, targeted, specific curricula that blended with and complemented the technology and pedagogical approach of online education. Their faculties understood the value of online programming, received the proper and requisite training, worked in collaboration with instructional designers, and taught and delivered quality courses that effectively engaged students across myriad disciplines. Their administrators and leaders provided sufficient, targeted, dedicated, and strategic resources to support online teaching and learning and incentivized faculty members to develop and teach online courses.

Importantly, these early and effective adopters of online education, at the institutional, college, school, departmental, and even program levels established administrative structures to facilitate and perpetuate the effective, efficient, and sustained delivery and design of online programs (Hoey, et al, 2014; Youger and Ahern, 2015; Raffo, et al, 2015; Brinthaupt, et al, 2011; Gold, 2011; Holt, et al, 2014; Totaro, et al, 2005; Bollinger and Wasilik, 2009; LaPrade, Gilpatrick & Perkins, 2014; Schmidt, Hodge & Tschida, 2013). Those institutions that did not do the above mentioned struggled with the implementation and integration of online teaching and learning or failed to do so altogether. The institutional successes of online education required and benefitted from forward-thinking and committed faculty members working in concert with administrators who thought and acted strategically, due in no small part to the establishment of administrative structures that fostered and cultivated online education.

The purpose of this paper is to describe what one academic unit at one institution—the School of Humanities and Social Sciences at Indiana University East—has done to ensure quality, consistency, and sustainability of online programs today and in the future, utilizing an administrative structure that fosters a culture of collaboration among faculty members and

between faculty members and administrators. Hopefully, other institutions that have adopted, integrated, and deliver online courses and programs; those who wish to expand their offerings and programs; and those considering adoption for the first time, can gain some value and insight and perhaps even apply some of the techniques and strategies described in this paper.

Literature review

There is a wealth of literature on the development, delivery, and design of online courses from both the teacher and learner perspective that is too exhaustive to detail here. Scholars and practitioners agree that students learn best when online courses are well designed and taught by active, engaged, and committed faculty members who provide consistent and detailed feedback in an interactive format. With an emphasis on efficiency, effectiveness, quality design, and active-learning, faculty members can ensure student engagement and learning, while fostering and facilitating a "classroom" conducive to learning (Youger and Ahern, 2013; Raffo, et al, 2015; Bluic, Goodyear & Piggott, 2009; Espasa and Meneses, 2010; Kearns, 2012; Sun, 2014; and Tsai, 2013).

To be effective and engaged online instructors, faculty members must intentionally and deliberately develop their teaching skills within the medium, rather than simply assuming that their "tried and true" traditional, face-to-face teaching techniques will translate to the online environment. Those faculty members that thrive in the online environment are committed to continuous improvement and skill development, understanding that connecting with students in the online environment oftentimes requires a different approach of skill set (Portugal, 2015; Hendricks and Bailey, 2014; Schmidt, Hodge & Tschida, 2013; LaPrade and Gilpatrick, 2014; Bair and Bair, 2011; Brinthaupt, et al, 2011; Rhoads and Rhoads, 2013; and Olson and Werhan, 2005). Additionally, it is incumbent upon administrators to provide the necessary resources to ensure quality, effective, and efficient course design, as design is just as integral to the overall process of online teaching and learning as delivery, especially when institutions utilize large numbers of adjunct faculty members to teach courses (Mandernach, Register & O'Donnell, 2015; Mueller, Mandernach & Sanderson, 2013; Raffo, et al, 2015; and Freeman and Tremblay, 2013).

The literature is relatively limited with regards to best practices or replicable systems for administrative structures that foster and facilitate effective, efficient, collaborative, and quality online teaching and learning across programs, disciplines, academic units, and institutions, especially at public colleges and universities. Hoey, et al (2014) offers sound advice for primarily private, christian institutions that is partially applicable or generalizable across all types of higher education institutions. Other studies (Herman, 2014; Holt, et al, 2014; Baran and Correia, 2014) partially address the subject, but not authoritatively or exhaustively. This paper attempts to fill a gap in the existing literature by describing the successful administrative structure at an academic unit of campus that is heavily invested in online education, providing some lessons and best practices that can be adopted by other, similar institutions, academic units and programs.

Indiana University East

Indiana University East (IUE) is a regional campus of Indiana University, located in Richmond, Indiana, with an enrollment of approximately 4,600 students. The institution offers primarily baccalaureate degrees, in addition to six master's degrees in a variety of disciplines. As one of five regional campuses of Indiana University, IUE serves a defined service region in east-central Indiana as well as several counties in southwestern Ohio that have a reciprocity agreement for in-state tuition. The institution's service region is declining in population and in the number of high school graduates, resulting in declining enrollments during the early and mid-2000s, and remaining a challenge today and in the future. As a result, IUE invested heavily in online education starting in 2007 and the result has been steady and significant growth, especially

between 2007 and 2014. Over the past seven years, IUE has doubled its enrollment, due primarily to the proliferation of online degree programs. Indiana University as a whole has been late to adopt online education on a large scale, so IUE was able to position itself as the leader in online education for the entire university, currently drawing students from 40 states and over a dozen countries that desire to earn an Indiana University degree online.

Today, online courses generate over 50% of all credit hours at IUE. Sixty percent of all online students take at least one online course per semester. Completely online programs include baccalaureate degrees in: Business Administration, Nursing, Mathematics, Natural Sciences, Political Science, Criminal Justice, Communication Studies, English, Psychology, History, and General Studies. Almost every other degree program on campus offers several online courses within the curriculum. Over the past several years, many faculty members have become innovators and online teaching and learning and the campus culture is one that is flexible, innovative, and open to new ideas with regard to pedagogy and curricular design. Faculty members and administrators alike understand the importance of online education to the institution. Simply, online programs support and fund traditional programs on campus and the institution has a mission to meet the needs of both types of students.

The School of Humanities and Social Sciences (HSS) is the largest academic unit at IUE, comprising nearly half the budget, half the students, and half the faculty. It boasts a number of online degree programs including: Criminal Justice, Psychology, Communication Studies, English, Political Science, History, and General Studies. Similar to the institution as a whole, HSS offers myriad online offerings in all its traditional, non-online programs as well, including online courses in Spanish, French, Fine Arts, Philosophy, Religion, Music, Sociology, Geography, and Anthropology. While enrollment across IUE has recently leveled off or even declined in some degree programs, HSS degree programs, particularly online degree programs, continue to grow, particularly in Criminal Justice, Psychology, Political Science, Communication Studies, and History.

For the past seven or eight years, IUE has enjoyed little competition within Indiana University for online students or online programs. During this time, the other four regional campuses and the core campuses in Bloomington and Indianapolis offered few, if any, online courses or programs. Until the Indiana University Office of Online Education was established in 2013, there was no unified effort among all Indiana University campuses to coordinate the delivery of online courses and degree programs. Now, the process of centralization across the entire university has begun, meaning more competition and more oversight for IUE. The exact relationship between the Indiana University Office of Online Education and the individual campuses of Indiana University will take years to define and clarify, with regard to oversight and delivery of online programs, revenue sharing, curricular design, and program development. However, in order to remain a leader in online education within the Indiana University, and to remain competitive in the external marketplace, IUE has had to continuously improve the quality, efficiency, and effectiveness of its online programs. The School of Humanities and Social Sciences at Indiana University East has led this continuous improvement initiative through establishment of its Lead Faculty in Online Programs initiative, described below.

Lead faculty in Online Programs initiative

In 2014, the Dean of HSS implemented the Lead Faculty in Online Programs initiative with the purpose of maintaining and improving the quality, efficiency, consistency, effectiveness, design, and delivery of online courses and entire degree programs within the school. The Office of Online Education at Indiana University had raised issues regarding the quality of IUE online programs and courses, based largely on the fact that Quality Matters (QM) had certified no IUE faculty. While QM certification does not guarantee quality online programs, it tends to be the standard across the academy (Youger and Ahern, 2015). The Dean took this charge as an opportunity not

only to spearhead QM certification among faculty within the School, but to also make other improvements in online program delivery, working with faculty innovators and leaders. During the spring 2015 semester, 44 of 45 full-time HSS faculty completed QM Level One training, in addition to nearly 20 adjunct faculty members. This effort and program, described below, is intended to ensure that HSS and IUE remain positively positioned within Indiana University and beyond as leaders in delivering quality online programs that effectively and efficiently engage students with quality offerings.

Phase One of the Lead Faculty program focused on the largest and most established online programs in HSS—Psychology, Criminal Justice, Communication Studies, Political Science, and History—with one Lead Faculty member per discipline, who coordinates and facilitates online teaching and programmatic efforts within his or her area. Duties and responsibilities include:

- Complete Level 1 and Level 2 QM training (level 3 optional)
- Complete advanced training on Canvas, the Indiana University learning management system (LMS)
- Communicate best practices in online teaching and learning to full and part-time faculty members through formal and informal training and mentoring in the discipline, program, and department
- Liaise with the Center for Teaching and Learning (CTL) on course design, best practices, updates, training, and innovations in online teaching and learning
- Lead one training session per semester for all faculty within HSS teaching online
- Oversee the eventual application of the QM rubric to all existing and new online courses in his/her program or discipline
- Serve as an informal and formal peer-reviewer of online courses in the discipline, program, and school
- Attend campus, university, disciplinary, regional, and national conferences associated with online teaching and learning
- Create course content, including: assessments, assignments, PowerPoint presentations, written content, video lectures, syllabi, readings, links, etc…
- Create one course "shell" per semester of a high-enrollment, general education course that can be standardized and used by well-qualified adjunct faculty members

Even though IUE and HSS had been delivering decent online courses and for a number of years, there were significant improvements to be made. Glaringly, there was little standardization across courses or sections of courses, resulting in confusion with regard to navigation and overall learning experience among students. Even with a consistent LMS, many of the courses "looked" different to students, resulting in confusion and inefficiencies. One of the goals of the Lead Faculty program is to provide a higher degree of consistency across courses and sections of courses to improve the overall student experience by providing greater clarity (Youger and Ahern, 2015; Raffo, et al, 2015; Brinthaupt, et al, 2011). Previously, a student taking multiple online courses might have to navigate and negotiate each differently, wasting precious engagement time with the instructor and resulting in confusion, frustration, and even poor performance. With greater consistency and clarity, hopefully that type of experience will be mitigated.

Another primary goal of the program is to develop standardized course "shells" of high-enrollment, typically general education courses with several sections per semester, often taught by several different adjunct faculty members. In the past, IUE had expected adjunct faculty

members not only to teach and online course, but also develop and design it, with no additional compensation, which was unfair. With the Lead Faculty program, well-qualified adjunct faculty members are no longer asked or expected to design courses. Rather, they are provided with templates designed by Lead Faculty and/or full-time disciplinary faculty members that require minimal tailoring prior to delivery. Now, adjuncts can concentrate on interacting with students, facilitating the course, grading, and providing feedback, rather than on time-consuming design (Mandernach, Register & O'Donnell, 2015). This process also allows the full-time faculty members to control curriculum, ensure the consistency, make requisite updates, and mine assessment data. For example, several courses including, Introduction to Psychology, American National Government, Introduction to Criminal Justice, and American History I may have several sections per semester, taught by several different adjunct faculty members. Ensuring consistency and quality across all sections of these courses, regardless of instructor, is the goal of these course "shells" created by the Lead Faculty member(s), in consultation with other disciplinary faculty members who possess the greatest expertise on the subject.

The five Lead Faculty members participating in Phase One were chosen for their experience teaching and designing online courses; their desire to gain additional online teaching, design, and training skills; their commitment to student learning, continuous improvement, quality; and their collegiality, especially within their academic departments and disciplines, due to the fact that they play a major role in training and working with other faculty members in many aspects of online teaching and learning. Appointment as a Lead Faculty member is an administrative responsibility that comes with a stipend of $2000 per academic year. Lead Faculty members are evaluated yearly and can be re-appointed or removed by the Dean, who meets frequently with the Lead Faculty as a group and individually to discuss issues, developments, and progress. The intellectual property developed by the Lead Faculty member (i.e. presentations, video lectures, written content, assessments) is shared jointly by the faculty member and the institution. The School pays for all program-related training and travel and has dedicated significant funds for that effort over a several year period. Phase One of the program has proven successful and Phase Two will be launched in fall 2015, including the following programs: Spanish, Anthropology, Philosophy and Religion, and English (graduate and undergraduate).

By improving the overall student learning experience, lessening the workload and expectations of well-qualified and underpaid adjunct faculty members, empowering greater curricular control among the full-time faculty, and improving clarity and quality of online programs, the Lead Faculty in Online Programs initiative will improve student retention, persistence, and perhaps even on-time graduation rates at Indiana University East. The program is successful because it is rooted in a culture of collaboration and a commitment to student learning between dedicated faculty members and forward thinking administrators. Other academic school and units at IUE are adopting the program in the same format, due to its initial successes.

Conclusion

Successful online programming in higher education depends in large part upon well-trained, dedicated, innovative, and student-friendly faculty members in addition to forward-thinking administrators who dedicate sufficient resources to training, technology, and course design. Collectively, those institutions that have the greatest success in online education, providing educational services that foster student learning and function effectively and efficiently, establish administrative structures that perpetuate these successes and breed innovation, using a collaborative model. Hopefully, the lessons described and implemented by the School of Humanities and Social Sciences at Indiana University East, an academic unit an institution heavily invested in online learning, can aid similar institutions. Further research needs to be conducted regarding the effects of administrative structures on online education overall.

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