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Written Communication and Learning

Gertrude (Trudy) Abramson

"Verba volant, scripta manent" (Latin proverb)
Spoken words fly away, written words remain.

Observations on Computing and Communication

My earliest experiences with computers were in the early/mid 1970s when I went to the local college to discover how the world had changed during my child-rearing years. "Ted," I said to my husband, "You may not believe me but there is a machine that thinks the way I do, with a respect for structure and logic." Computers worked on an input-processing-output dynamic. People wrote instructions, the computer carried them out, and others used the output of the process. We believed that teaching children to program would help them develop lifelong skills of logic and organization. Similar to today, the hurdle we faced was getting teachers to master necessary skills so that they could instruct or guide their students.

The decades have witnessed exponential improvements in hardware, software, and networking technology. Today's computers do everything that yesterday's did, faster, cheaper, and more reliably and they do much more. Had we named the machines today, we might have called them *communicators*. Each day's print newspapers and online newsletters wax poetic on distant, collaborative tools and their multiple uses in social and professional networking, in business, and in teaching and learning across the grades. The need to learn programming has been replaced with a need to use applications programs. Many educated people, young and old, are irretrievably drawn to a global, albeit English language, community bound together by an ever-increasing variety of mostly written communications.

For the Love of Written, Asynchronous Communication

The motivation for the editorial was a slim volume, ***84 Charring Cross Road***, written in 1970 by Helene Hanff. Essentially, it is an autobiographical sharing of a 20-year correspondence between the author and Frank Doel, an antiquarian bookseller in London, England. The story line begins in 1949, when Hanff responded to an ad from the bookshop for obscure British literature. Over the years, the author, through an exchange of letters and gifts, establishes deep friendships with Doel, his colleagues, and his family. Letters with increasingly friendly and personal content were sent with and without purchase orders and gifts. The bookseller found volumes for Hanff at prices far lower and in condition far better than she could get in New York and she sent food packages to post World War II England. What was so poignant was the power of the written word in the establishment of life-long friendships. The book is highly recommended to readers.

My love for writing is an inherited trait. My mom kept a hand-written journal for 75 years. For her ninetieth birthday, she asked for and was given a computer with the word processor set on 14 points bold. She proceeded to transcribe all 75 years of memories which we have on disk and in print binders but that she did not want published. Our granddaughters have delighted their classmates with many of her tales. Three highlights from my formative years come to mind: Getting published in a magazine for girls, winning a sponsored holiday contest, and editing in the voice of the writer for the graduation yearbook. Way back then, I corresponded with pen pals from all over the English-speaking world and served as volunteer student librarian, working after school and Sundays for the love of being around books.

The first class I taught was a third grade; the year was 1961-1962. With the conviction that the path to successful citizenship required strong reading and writing skills, we read many books, mostly aloud, wrote stories for every occasion and read what we wrote to one another and to any and all adults who were willing to listen. One amazing little boy observed: "I am not so good at reading writing (words in books) but I am really great at writing reading (words for others to read)." And he "read" his words aloud whenever possible, largely from memory. Intuitively, he had captured the essence of the reading/writing communication process. His remarks have stayed with me.

The Communication Process

All communications are two-entity processes, spoken, written or non-verbal, from a sender to a receiver. Strange as it may seem at first, not all two-way communication contains two live entities. In person or on the telephone, a speaker reaches out to a listener and the listener responds – two people. A book, letter, memo, or electronic print becomes a communication when it is read – one person, one thing. A facial or bodily, non-verbal expression needs acknowledgement to qualify – two people.

Conversation is a two-way process in which participants take turns as sender and receiver. It works best when both people pay attention to the words of the other and do not take the subject off track. There are definite advantages to *asynchronous* (not in real time), written conversation. One can read and reread the message, think before responding, compose a response, and reconsider the words before posting to the recipient.

The essence of a communication is not necessarily tied to a medium. Recently, a speaker shared the theme of a seminar he had attended: There were two kinds of learning, one based on *transmission* (from the lecturer/sender to the student/receiver) and the other on *exchange* (also known as two-way communication or discussion). As is typically the case, the speaker advocated exchange as the more meaningful process and delivered his message in transmission mode.

A decade ago, with the online learning explosion came the shift of the teacher from the *sage on the stage* to the *guide on the side. Constructivist learning* (in which learners build mastery by active participation) was retrieved from the dust bin of educational theories to explain why learning would be better when the focus of instruction was shifted from the teacher to the learner. *Engagement*, a term that feels a lot like *pay attention*, moved from being the first part of the instructional process to the process-in-entirety.

How many interactions or conversations or posting of links to websites must be carried out before a subject is mastered? Learning is a difficult process. Who would maintain that one could become an excellent golfer by observation or discussion? A great deal of precise instruction and guided practice is needed. Cognitive learning requires similar steps. Engaged learners may persist but will master subject matter only when the necessary investment in mastery is made. The current trend to allocate part of a grade that is supposed to measure mastery to participation dangerously dilutes achievement.

Today, we are besieged with social networking tools, each identified with a label that proclaims "Invented by a young person to make fun of the establishment." Why else would we be besieged with *blogs, wikis, nings, twitters,* and other interactive, online tools with comparable names? Blogs and wikis are writing/reading instruments and a podcast is a speaking (recording) and listening (playback) tool often packaged with blog space for user responses. A blog (from web and log) is an online journal that accepts comments to posts and archives them so that the most recent response is at the top – just under the blog posting. The person who owns the blog is a blogger. A wiki (Hawaiian word meaning quick) is an online document that may be edited collaboratively. Ning (Chinese word meaning peace), is an online platform through which people can create and maintain social networks usually with a theme. Twitter (from the bird sound tweet) is a micro-blogging service that allows users to exchange tweets or text-based posts up to 140 characters long.

These applications and their peers that enable internet based discussion and social networking are easy-to-learn, inexpensive or free to use, and make people feel part of something real. It may be possible to measure process writing with web 2.0 tools, but one would be hard-pressed to justify measuring a social or physical science with conversation about the subject. It is possible to use the tools as forums for collaborative and cooperative subject-specific efforts, but there is much instructional work to be done in terms of setting the ground rules, monitoring the process, evaluating individual contributions, and assessing subject matter mastery.

In This Issue

For the first time in memory, we present an issue devoted exclusively to a corporate workforce or to learners involved in the government and the military. Each of the articles, nevertheless, offers meaningful suggestions for instruction delivery that are valuable to all readers.

Maureen Murphy retrieves a technique that curriculum developers have used for many years: chunking of instruction. At a time when many proclaim that technology has changed the human brain, her study is particularly timely. As old-timers would have predicted, matching training to adult attention spans improved learner reaction, learning score, and retention.

James Richard Kiper explores several online learning strategies for instructors to incorporate into the training programs of large organizations. He creates a new acronym, CALO, to designate a company, agency, or large organization.

Jeff Kissinger and **Bill Ganza** describe a yearlong, collaborative project that resulted in six community-college level courses converted to a mobile course delivery system. The students targeted for these courses are military personnel deployed in the field.

Cindy Brewer, Alison Graham, Stephanie Geckle, and **Kevin J. Brown** present a major e-learning initiative for a large health care organization. E-Learning Central is a single portal for all Orlando Regional Facilities. During its first 15 months of operation, it tracked approximately 45,000 course completions.

Executive Editor, **Gertrude (Trudy) Abramson,** writes about written communication and learning. Media evolve and access rates improve, but the essence of words in writing retains its significance.

Raymond G. Fox, Chairman of Learning Technology Institute and President of the Society for Applied Learning Technology (SALT®), writes about alternatives in instruction delivery: a commentary on the systems approach to education. In this issue we publish the first of a series of his collected viewpoints which will become a more comprehensive treatment of this subject.

Matching Workplace Training to Adult Attention Span to Improve Learner Reaction, Learning Score, and Retention

Maureen Murphy

Abstract

The purpose of the study was to investigate the application of the chunking process to the design and delivery of workforce training. Students in a 1-hour course (N = 110) were measured on learner reaction, learning score achievement, and knowledge retention to see whether or not chunking training in a 1-hour session into three 20-minute sessions to match adult attention span resulted in a statistically significant difference from training for 1-hour without chunking. The study utilized a repeated measures design, in which the same individuals in both the control group and experimental group took a reaction survey instrument, a posttest after the training, and again 30 days later. Independent samples *t* tests were used to compare the mean performance scores of the treatment group versus the control group for both sessions. Cohen's *d* was also computed to determine effect size. All hypotheses found a statistically significant difference between the experimental and control group. Results indicated that matching training to adult attention span did improve learner reaction, learning score, and retention.

Keywords: adult attention span, chunking instruction, learner reaction, learner score, knowledge retention

Introduction

Adult attention span during work place training has a mysterious quality. Some professionals attribute various brain dysfunctions to explain participants' inability to stay focused on activities for long periods of time, but the concern should be a match between attention and retention (Binder, Haughton, & Van Eyk, 1990). Learning without paying attention is difficult (Davenport & Beck, 2001), and to prevent learners from multi-tasking, chatting, sleeping, or switching off during training, breaking training delivery into 20-minute chunks to match their attention span can be effective (Black & Black, 2005; Bowman, 2005; Buzan, 1991; Middendorf & Kalish, 1996; Ward & Lee, 1995). Chunking material allows new information to be processed and strengthened in the brain (Middendorf & Kalish, 1996).

Trainers know not to plan or show a movie after lunch, but few are aware that adult learners can attend to training for no more than 20 minutes at a time (Bowman, 2005; Middendorf & Kalish, 1996). Learners retain and apply more after training by improved instructional design (Parry, 2000), and one such improvement to instructional design and delivery is instruction in 20 minute chunks (Dwyer, 2002; Roche, 1999).

Underlying Literature

The 21st century is emerging as the age of the brain because management has begun to recognize the need to win talent wars, manage knowledge workers, and boost creativity, and to gain a competitive advantage by adding and leveraging the collective corporate brainpower (Vickers, 2006). Learners tend to remember the first and last items heard (Lucas, 2003), so they will remember more if there are more "firsts and lasts" as enabled by chunking. There is a direct relationship between instructional strategy and learner motivation and attention. Two Instructional Systems Design (ISD) Models specifically recognize the criticality of learner attention: Keller's ARCS Model and Gagne's Nine Instructional Events Model.

Keller (1983) recognized the importance of the potential learner's mental state in learning with the ARCS model of attention, relevance, confidence, and satisfaction. Keller's ARCS model shows that effective learning starts with the learner's focused attention as conditional to achieving a successful learning experience (Quinn, 2005). Learner attention is the first step in Gagne's model of Nine Instructional Events (Kruse, 2006). Placing Gagne's Nine Events of Instruction beside Keller's ARCS Model and adding a time element demonstrates the application of adult attention span to ISD (see Figure 1).

Gagne's Nine Events of Instruction	Keller's ARCS Model	
1. Gain learner attention 2. Inform learner of training objective 3. Stimulate recall of prerequisite learning	Attention	Attention Span
4. Present new material 5. Provide learner guidance	Relevance	
6. Elicit performance 7. Provide feedback	Confidence	
8. Assess performance 9. Enhance retention and recall	Satisfaction	

***Figure 1*. Attention span applied to ISD models.**

Over 30 years of controlled experiments and case studies, Csikszentmihalyi (1990) created volumes of empirical evidence to conclude that motivational issues are as important to learning as cognitive issues in learning. Learner motivation and attention was critical to the understanding of how and why people learn (Efklides, Kuhl, & Sorrentino, 2001; Keller, 1987). Attention gaining for learner motivation is the most often overlooked component of an instructional strategy and perhaps the most critical component needed for employees as learners (Kruse, 2006). The best designed and delivered training program will not transfer to work performance if the learners are not attentive. Attention is an active process of filtering sensory information from the instructional environment and combining it with memories (Clark, Nguyen, & Sweller, 2006).

The ability to mentally focus, attend, and sustain concentration is an internal process within the brain (Itti, Rees, & Tsotsos, 2005). The right contributions from the external world ensure attention span for intended learning, while the wrong stimuli can hinder its development and even diminish it (DeGaetano, 2004). The brain-based approach to cognitive processing for learning states that the brain does not receive the training sequentially and chronologically like a camcorder (Middendorf & Kalish, 1996). The brain takes information and parses it into categories, appending it into existing knowledge categories or forming new categories (Middendorf & Kalish, 1996). In this context *parse* means to take apart the training experience into chunks categorized by the brain. The parsing is unique to each learner, but every learner parses and categorizes. The learner must be in a state of attention to receive and parse the training (Middendorf & Kalish, 1996). When designing and delivering training, attention span and how the mind works should be considered, and training should incorporate attention gaining, or regaining, activities using 20 minutes as the learner attention span (Middendorf & Kalish, 1996).

This is an exciting era of neuroscientific and cognitive research which delves into the composition of the brain and brain functions and capacities such as attention, learning, memory, and skill (Lucas, 2003). Neuroscience is life science that deals with the anatomy, physiology, and biology of nerves related to behavior; learning and cognitive research is based on knowledge management (Lucas, 2003). The key to learning is the brain's ability to convert a current experience into code that travels through connections of neurons to storage, so that later, the experience can be recalled (Bragdon & Garmon, 2003).

A brain-based theory that impacted learning was presented in 1956 when George Miller explained information processing by the brain in terms of memory ability in which short-term memory can hold between only five and nine items of information at a time. Miller did not prescribe a unit of time such as 20 minutes.

As a concept, attention is behavioral, but its observable manifestations are based on brain mechanisms (Itti et al., 2005). This study serves to address concerns for attention and time as resources in training design and delivery. A chunk of learning delivered in 20 minutes matches the average adult attention span.

Dale Carnegie, a guru of effective public speaking, stated that the key to all persuasive speaking is the ability to grab the attention and interest of the audience from the outset. Carnegie captured one of the primary purposes of initial training strategies, which is to capture learner attention and interest and set the initial tone of training delivery. The harm in continuing training past the learner's attention span could impact the learner's reaction, the learning achievement scores, retention, and the transfer of skills to the workplace.

The Experimental Study

The study was conducted to compare the outcomes from two designs: a 1-hour course compared

to three 20-minute chunks, with attention-gaining strategy at the start of each chunk to show that a difference exists in learner reaction, learning score achievement, and knowledge retention for training designed and delivered with an initial attention-gaining strategy and a delivery time of three 20-minute chunks rather than an hour.

The researcher used a training module that is 1-hour in length for the control group, then copied it and broke the 1-hour training into three sessions of 20 minutes each as the experimental intervention. The control group received the training in a 1-hour block (see Figure 2). An additional 15 minutes was added to permit the administration of the survey and the posttest, and did not exceed 90 minutes.

Gagne's Nine Events of Instruction	Keller's ARCS Model	CONTROL GROUP
1. Gain learner attention 2. Inform learner of objectives 3. Stimulate recall of prerequisite learning	Attention	All 3 topics delivered in 1 hour (60 minutes)
4. Present new material 5. Provide learner guidance	Relevance	
6. Elicit performance 7. Provide feedback	Confidence	
8. Assess performance 9. Enhance retention and recall	Satisfaction	Survey and post test 15 minutes

***Figure 2*. Control group design.**

The experimental group received the training in three 20-minute chunks with a 5-minute break between each chunk (see Figure 3).

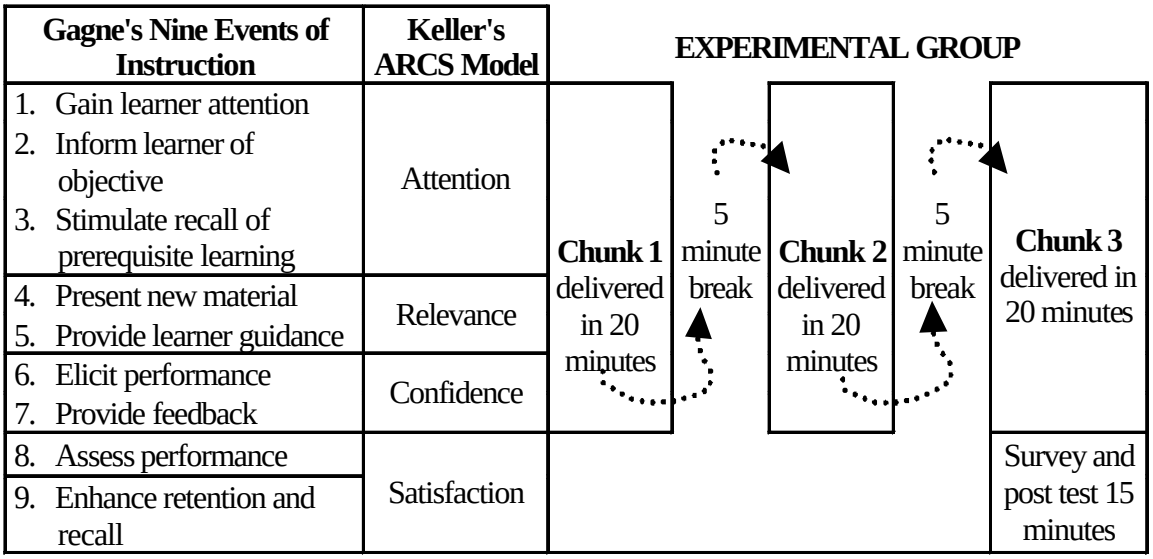

***Figure 3*. Experimental group design.**

The study utilized a repeated measures design, in which the same individuals in both the control group and experimental group took an instrument after the intervention and then again 30 days later. Both groups were given a post training survey to assess whether they liked the training, a written posttest to measure learning gained from the training, and a repetition of the written posttest, 30 days later.

The target population for this study was employees who participate in Brown Bag programs through Employee Resource Groups (ERGs) at a major communications company in Texas. Brown Bag programs are 1-hour, live, virtual training sessions conducted during a workday lunch time. Approximately nine different programs are offered each month. Brown Bag topics are determined based on employee interest as gathered from an annual survey.

A power analysis was conducted to determine the optimum sample size needed for this study. Testing hypotheses 1 to 3 requires 26 individuals in each group for power to equal .80. The power calculation is based on an alpha level of .05 and a large effect (d=.8) (Cohen, 1988, Table 2.4.1).

Subjects were selected from the defined population by using a cluster sampling method. In this case, it was more feasible to select groups of individuals than to select individuals from a defined population (Gall, Gall & Borg, 2003). Random selection and assignment were used from multiple ERGs. The researcher used an existing survey instrument with a Likert scale which matched the ARCS model(see Table 1). The posttests used true or false and multiple choices items. The posttest instrument items were evaluated for content validity by a panel of experts.

Table 1

ARCS model	Survey instrument prompt
Attention	1. I clearly understood the course objectives (got my attention).
Attention	2. The way this course was delivered was an effective way for me to learn this subject (kept my attention).
Relevance	3. The instructor(s) was knowledgeable and I see how this is relevant to my work.
Attention	4. The instructor(s) managed the class effectively (managed my attention).
Satisfaction	5. I was satisfied with the level of feedback I received from the instructor(s).
Satisfaction	6. Overall, I was very satisfied with the instructor(s).
Confidence	7. My skills and/or knowledge increased as a result of this course (increased my confidence).
Satisfaction	8. I will be able to apply the skills and/or knowledge taught in the course back on the job (relevant to my work and am confident I can do it).
Satisfaction	9. Overall, I was very satisfied with the course.
Satisfaction	10. The equipment (PCs, tools, systems, etc.) was functioning properly.

ARCS Model Components Matched to Survey Items

Reliability statistics could not be found on the survey instrument prior to usage, so it was calculated after use with a Cronbach's alpha. Data was collected at the end of the session and 30 days past the session (see Table 2).

Table 2

Data Collection

Data collection	Post session data collection		30 days past session
	Reaction Survey	Learning Test	Knowledge Retention
Experimental group	X	X	X
Control group	X	X	X

Learners attending each session were requested to complete the reaction survey and learning test at the end of the training session. Descriptive statistics were calculated to summarize and describe the data collected. Inferential statistics were used to reach conclusions and make generalizations about the population based on data collected from the sample. Independent samples t-tests were used to compare the mean performance scores of the treatment group (i.e., the sections using redesigned materials) versus the control groups for all sessions. Responses from the surveys were stored in a computerized database and transferred to statistical software for statistical analysis. Cohen's *d* was computed; it is the difference between means divided by the collective standard deviation for the means (*d* = *M*1 - *M*2 / ópooled) for effect size (see Table 3). Cohen's *d* is the mean difference divided by the pooled standard deviation.

Table 3

Analysis by Hypothesis

Hypothesis	Independent	Dependent	Analysis	Effect size
H_1: Learner Reaction	Group A Group B	Scale Score	Independent samples t-test	Cohen's *D*
H_2: Learning Score	Group A Group B	Number of items correct	Independent samples t-test	Cohen's *D*
H_3: Retention	Group A Group B	Number of items correct	Independent samples t-test	Cohen's *D*

A total of 110 participants were in the study, with 87 completing the study. Table 4 provides details on participant completion rates.

Table 4

Descriptive Statistics of Participants and Study Completion Rates

Group	Start *N*	Complete *N*	Study completion rates
Treatment	58	44	76%
Control	52	43	83%
Total *N*	110	87	79%

The reliability of the scores in this study from the survey, posttest, and 30-day posttest was analyzed using coefficient alpha, a measure of internal consistency. Results for the reliabilities are shown in Table 5.

Table 5

Score Reliability Measures

Group	Survey	Posttest	30-Day Posttest
Treatment	.843	.347	.359
Control	.880	.638	-1.378
All	.928	.634	.120

The single, 10-item instrument used for both the posttest and the 30-day posttest was created by a team of three content experts where instrument items had admittedly differing difficulty levels. Coefficient alphas for the survey instrument are high, as .70 is considered acceptable, but the coefficient alphas for the learning, the posttest immediately following the session, and retention, the posttest taken 30 days after the session, differed. Each of the study's three hypotheses were analyzed using independent samples t tests.

Hypothesis 1:

$H_{1:}$ There is not a statistically significant difference in learner reaction survey scores between participants who receive training in three 20-minute chunks with a 5-minute break between each and participants who receive the same training in a single 60-minute block. (The results of the t-test are summarized in Table 6)

An independent samples t test was conducted to determine whether there was a statistically significant difference between the group receiving training designed, developed, and delivered in 20-minute chunks and the group that did not. Table 6 reflects the results. The *t*-test conducted did not assume equal variances ($F = 13.762$, $p < .001$). In this case, there was a statistically significant difference in the performance measures between the two groups. Therefore, this study rejected hypothesis 1. Additionally, the mean difference found was deemed to be practically significant ($d = 2.563$).

Table 6

Reaction Survey Scores Analysis

Dependent variable	Group	*n*	Mean	SD	*t*	Df	p
Reaction Survey Scores	Control Group	52	3.962	.4481	-13.219	74.445	<.001
	Experimental Group	58	4.876	.2312			

Hypothesis 2:

$H_{2:}$ There is not a statistically significant difference in learning score achievement between participants who receive training in three 20-minute chunks with a 5-minute break between each and participants who receive training in a single 60 minute block. (The results of the independent sample t-test are summarized in Table 7.)

An independent samples t test was conducted to determine whether there was a statistically significant difference between the group receiving training designed, developed, and delivered in 20-minute chunks and the group that did not. Table 7 reflects the results. The *t* test conducted did not assume equal variances ($F = 21.451$, $p < .001$). In this case, there was a statistically significant difference in the performance measures between the two groups. Therefore, this study rejected hypothesis 2. In addition, the mean difference found was deemed to be practically significant ($d = .8619$).

Table 7

Learning Scores Analysis

Dependent variable	Group	*N*	Mean	SD	*t*	Df	p
Learning scores	Control Group	52	8.115	1.832	-4.437	72.936	<.001
	Experimental Group	58	9.362	.9118			

Hypothesis 3:

$H_{3:}$ There is not a statistically significant difference in knowledge retention scores between participants who receive training in three 20-minute chunks with a 5-minute break between each than participants who receive training in a single 60-minute block. (The results of the independent sample t-test are summarized in Table 8.)

An independent samples t-test was conducted to determine whether there was a statistically significant difference between the group receiving training designed, developed, and delivered in 20-minute chunks and the group that did not. Table 8 reflects the results. The t-test conducted did assume equal variances ($F = .729$, $p < .001$). In this case, there was a statistically significant difference in the performance mea-

sures between the two groups. Therefore, this study rejected hypothesis 3. In addition, the mean difference found was deemed to be practically significant (d = 1.0819)

Table 8

Knowledge Retention Scores Analysis

Dependent variable	Group	*n*	Mean	SD	*t*	Df	p
Knowledge Retention Scores	Control Group	43	8.0465	.81514	-7.408	85	<.001
	Experimental Group	44	9.4091	.89749			

The t-test conducted did assume equal variances (F = .729, p < .001). The independent sample t-test determined the two groups' (i.e., experimental, control) means were statistically significantly different from each other. Therefore, this study rejected hypothesis 3.

Conclusion

The purpose of this study was to show that a difference exists in learner reaction, learning score achievement, and knowledge retention for training designed and delivered with an initial attention-gaining strategy and a delivery time of three 20-minute chunks rather than in an hour. Learners in the course were measured on how well they liked the program via a reaction survey, learning of the content via an end-of-course test, and the same test used as a follow-up test 30 days after taking the course.

This first and landmark study serves to establish a baseline for future research. Corporate workforce development, regardless of the current instructional design model in practice, could include chunking materials to improve learner reaction survey scores, learning score achievement, and knowledge retention. Another opportunity may be for learners to consciously self-monitor their attention and prompt the instructor for a break. Matching training to adult attention span through chunking improves learning opinion, learning, and retention so practitioners should design and deliver training in chunks.

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Online Strategies for Teaching Business Processes in Large Organizations

James Richard Kiper

Abstract

Changes in technology, security, and economics are driving a growing number of large organizations to make wholesale changes to the way they do business. Private corporations, as well as government agencies, are seeking the most efficient methods of training their large and diverse workforces without compromising their operations or competitiveness. By reviewing specific challenges and training needs, this article explores several online learning strategies for instructors to incorporate into the training programs of large organizations. Recommendations for preparing online instructors and evaluating such programs are also provided.

Keywords: Online Learning Environment, online instruction, corporate training, business processes

Introduction

Large organizations that transition to new business processes have special training needs. Many of these organizations have begun efforts in business process re-engineering (BPR), an activity that seeks to make an organization more efficient by modifying workflow and eliminating wasteful tasks. For example, government agencies such as the Federal Bureau of Investigation (FBI) are attempting to modify existing business processes as they move from a paper-based workflow to an electronic system of record (Miller, 2005). Inevitably, radical modifications to corporate business processes cause huge changes in policies and technologies, and therefore require effective training methods to communicate these changes to the entire enterprise.

As an additional challenge, large organizations have a diverse workforce which may include dozens of job families, varying levels of experience, and offices that are located all over the world. How does such a large organization prepare its employees for an imminent corporate transformation? This paper will explore how Online Learning Environment (OLE) technologies may be leveraged to facilitate the preparation of large organizations for significant business process transitions.

Within the context of this paper, a new term is defined for the sake of readability: a CALO will refer to "a Company, Agency, or other Large Organization." It is further assumed that a CALO is comprised of thousands, and perhaps tens of thousands of individuals in its workforce. An Online Learning Environment (OLE) is defined as any set of technologies that facilitates learning through the Internet or web-based tools. OLEs are implemented in a variety of ways for different types of organizations, as a review of the literature will reveal.

Challenges in Training CALOs

It is clear that traditional instructional methods will not meet the needs of large, diverse, and dispersed organizations. In the past, a CALO's instructor-led training course with PowerPoint slides may have been an acceptable way of educating small groups of employees who needed to receive training on a limited amount of material. However, such training seminars require physical training facilities, presentation equipment, and time commitments from both teachers and students. When thousands of employees are mandated to rapidly complete a specific training block – say, a standard course on blood borne pathogens – a "click and talk," face-to-face presentation may not be logistically feasible.

When this situation occurs, the training content is often transformed into web-based training (WBT) modules and delivered through a learning management system (Hall, 2003). Delivering content through WBT lessons is one OLE approach that allows employees the flexibility of completing the training at their convenience, and provides managers an efficient way of tracking employee training progress.

However, while converting traditional course materials to WBT lessons may be an effective way to deliver limited-scope training to masses of employees, it does not address the problem of training large numbers of transformed business processes. If a CALO intends to train tens of thousands of users on an entirely new way of doing business, it will need a much more rigorous and agile training strategy. This strategy must follow a detailed process in order to determine the correct use of an OLE for the CALO. Instructional designers need to define the training needs for the CALO, select the appropriate instructional strategies, prepare the online instruc-

tors, and evaluate the effectiveness of the OLE-based training program. Each of these areas presents its own challenges for training a CALO.

Identifying Training Needs

The first step for the CALO instructor is to identify the employee performance problem and articulate how instruction will solve the problem. Morrison, Ross, and Kemp (2004), define training needs as the "gap between what is expected and the existing conditions" (p.32). CALOs that undertake a significant transition will have many types of training needs, because the transition could effect:

- changes in the corporate culture as a whole,
- modifications in policies managed by departments, and/or
- procedural changes in how each individual performs on the job.

For these situations, a training needs analysis should be especially detailed and mindful of the varying job roles of employees – and therefore the varying levels of training needs – that exist in a sophisticated organization.

Recognizing that no one knows the CALO as well as the CALO employees themselves, O'Brien and Hall (2004) proposed a Training Need Analysis (TNA) model that facilitates a CALO's ability to develop an OLE solution for its own training needs. Their TNA design methodology identifies up to four training levels, depending on the type and size of organization. Level 1 identifies general training that is relevant to every employee in the company. Level 2 training pertains to the employee's level in the organizational hierarchy, such as an executive manager, supervisor, or general worker. Level 3 incorporates training needs that are relevant to each functional area, or department, of an organization. Finally, Level 4 identifies specific training that is required for each job role, such as a file clerk or salesperson.

The TNA approach presented by O'Brien and Hall is flexible enough to be applied to a variety of organizations, and may even lead to a job analysis, or "a listing of all the tasks an individual performs in a job" (Morrison, Ross, & Kemp, 2004, p.44). If structured properly, the granularity of these business processes would facilitate the development of learning objects for learning management systems (O'Brien & Hall, 2004). Learning objects are units of instruction that address a limited amount of material. In electronic form, learning objects are assigned metadata that allows them to be sequenced and reused in a variety of contexts and applications (Beck, 2005). Therefore, by using the TNA model, instructors can map business process attributes to the content structure of learning objects.

A TNA methodology similar to that developed by O'Brien and Hall needs to be implemented in a CALO that is undergoing an enterprise-wide transition, because a CALO cannot afford to waste resources delivering training content to those who do not need it. Executive managers receive "executive level training." Clerks receive "clerical training." Supervisors receive "supervisory training." Each individual should receive only the training that is relevant to his own job role, functional area, or position in the company.

Identifying the specific training needs of the CALO may lead to the selection of one or more OLE solutions, which could include anything from a simple collection of online training products to a complete web-based instructional system (Dabbagh, 2005). Following a rigorous TNA process to define the OLE requirements will improve the efficiency of the CALO's training program, as the OLE solution will "meet their individual requirements using cost effective methods and just enough training techniques" (O'Brien & Hall, 2004, p.939).

Selecting Instructional Strategies

Bonk and Zhang (2006) propose a simple model for organizing online learning. Named R2D2, their strategy is structured around the learner actions of read, reflect, display, and do. Convinced that online students have different learning styles, Bonk and Zhang recommend different OLE activities for learners who enjoy reading and listening to explanations (e.g., e-publications, presentations, streaming audio), those who like to reflect on instructional material (e.g., threaded discussion forums, group paper writing), those who prefer visual displays and pictures (e.g., concept mapping, Flash animations), and those who desire hands-on experience by doing (e.g., simulations, project-based learning). However, despite their effective mapping of OLE technologies to learning styles, Bonk and Zhang acknowledge a "notable overlap" (p.259) of the R2D2 categories. For example, an online student would obviously "acquire knowledge prior to knowledge use" (p.255), implying that at least two categories of OLE technologies are required. This untidy application of the model would suggest a different approach to the problem of online organization.

Rather than trying to map the R2D2 model to supposed learning styles, the online instructor may find it more useful to apply the R2D2 categorization of OLE technologies to the training needs of a CALO. Given that members of a CALO have varying training needs, would it not make sense to find an online training solution that matches their specific roles in the organization? The following example will illustrate the point.

Suppose that a CALO decides to undergo a major business process transition and hires a consultant to deliver an OLE training solution. In the

"read" phase of R2D2, the online instructor would lead executive managers through an exercise that includes reviewing white papers and listening to industry practitioners to learn standards, limitations, and best practices for organizational transformations. The materials may be delivered to the executives in an OLE, which also provides the capability for online discussions as the executives decide on high level core business processes and the general direction of the CALO.

During the "reflect" stage of R2D2, managers of CALO branches or divisions would be tasked with designing the implementation strategy for the CALO's executive vision. With the assistance of an online facilitator, they would review the materials previously selected by the "read" phase, and decide how industry best practices can be aligned with the strategic goals of the CALO. Online technologies such as Sharepoint could help manage the documentation for their plan, while the "track changes" and "comment" features of Microsoft Word could facilitate their e-collaboration (Spector, 2005).

Taking the electronic portfolios developed by branch managers, the front-line managers would participate in the next R2D2 phase and "display" what the business process transition looks like on a tactical level. Using collaborative environments such as a wiki, these managers could learn the basic concepts of business process modeling, and then propose and discuss actual business process models. At this stage, an online instructor would use the wiki to gather electronic resources such as tutorials, lead the students to develop their own process models, and then direct them in evaluating each others' models with online comments. Other such multilevel educational uses for a wiki are described by Parker and Chao (2007).

Once the business processes have been defined, the CALO front-line employees are ready to learn how to "do" the business of the organization. While web-based training (WBT) could be used to bring everyone to a baseline knowledge of the CALO's business processes, the workers who implement these processes may benefit more from online project-based learning and case simulations. Once again, an online instructor may exploit the capabilities of wikis, blogs, and threaded discussion boards to create realistic and relevant hands-on content for the students (Bonk & Zhang, 2006).

The above example illustrates how the R2D2 model – read, reflect, display, and do – may be a useful tool in organizing online instructional content for a CALO. It is a modular approach that enables one level to build upon another, and facilitates customized instruction for each employee role in the organization.

Preparing Instructors

Quality online learning requires quality online teachers. Yang and Cornelious (2005) provide a detailed description of the roles of the online instructor, who becomes a "coach, counselor, and mentor" in some circumstances, a "facilitator or moderator" in other situations, and a "learning catalyst" throughout online interactions (p. 3). A CALO with thousands of employees would require a large team of online instructors, each of whom would know how to orient the students to the new learning environment, encourage participation, and measure the effectiveness of the interaction – all while building relationships and fostering a sense of community.

Eshet (2007) argues that online instructors need proficiencies in the digital world that go beyond online social skills. They need the visual skills to recognize graphical representations, such as symbols and icons, which help them navigate online information. They need reproduction skills that enable them to collect preexisting, independent pieces of online information and rearrange them to create new meanings for students. They need "hypermedia skills" (p.17) to stay oriented and focused while accessing information in the non-linear, branching realm of the Internet. They need information skills to be able to sort out legitimate and useful information from the online sea of unregulated data and present it to students in an unbiased way. Finally, instructors need real-time skills that are needed to "respond constantly to a large amount of real-time feedback and questions from the students and at the same time continue the lecture" (Eshet, 2007, p. 18). With all of these responsibilities placed on the online instructor, it is little wonder they experience increased time demands (Spector, 2005) as well as a high rate of burnout (Hogan & McKnight, 2007).

Evaluating Impact

Spector (2005) reports that a common concern among online instructors is that the additional time and effort they invest into online instruction is not being considered for promotion or tenure opportunities. In fact, Spector discussed this problem with the chairs of six instructional technology departments and found that "none of their respective colleges have a policy in place to evaluate online teaching…" (p.17). While assessing the performance of online instructors is important, a bigger challenge lies in the evaluation of the overall OLE-based instructional plan. A CALO being introduced to OLE technologies would certainly not have a plan in place to evaluate online instruction, so how can stakeholders know if the instruction was worthwhile?

The evaluation of online instruction must go beyond simply comparing learning achievement to face-to-face instruction (Kim & Bonk, 2006). After a CALO designs a training program to communicate its business processes, it needs to evaluate the effectiveness of the training itself. Mahapatra and Lai (2005) claim that the evaluation of end-user training programs is a largely neglected area of research. Training evaluation is typically limited to an end-user assessment at the end of a course – and this is little more than an indication of how the students perform, rather than how the training is meeting the needs of the organization. Much more feedback is needed to improve the effectiveness of the training program itself – that is, to improve the way the organization is communicating and implementing its business processes.

Mahapatra and Lai propose five levels for evaluating training programs, four of which are based on a similar model introduced by Kirkpatrick (1998). The first level measures how well technology was integrated into the training strategy. Online components to training programs are becoming increasingly popular since they provide a "low-cost anytime-anyplace alternative to face-to-face, classroom-oriented training" (p.68). Level 2 of the evaluation measures the end-user reaction to the training program. For example, the trainees would express their opinions about whether the training content was clear, comprehensive, and meaningful to their jobs. The third level of evaluation assesses the knowledge and skills gained by the end-user, as they relate to the training objectives. The job-related transfer of the learned knowledge and skills is measured by Level 4 evaluation methods, which should take place after several weeks of applying the skills on the job. Finally, Level 5 evaluation measures the organizational effect of the training, which speaks directly to the company's return on the investment that was made in the training program.

One may notice that the above levels of evaluation roughly correspond to the interests of CALO employee roles as described in O'Brien and Hall's (2004) TNA model and suggested for Bonk and Zhang's (2006) R2D2 model for online instruction. At this point another illustration may be helpful.

Suppose a CALO needs to comply with a congressionally-mandated requirement to train its workforce in information security (InfoSec). For the sake of simplicity we will assume that a single delivery method, web-based training (WBT), is chosen as the means to deliver and track the instruction. At the ground level of the evaluation plan, training managers would examine how well the WBT technology delivered the instruction in terms of availability, reliability, and appropriateness to the training goals. At the second level of evaluation, the end-user workers would be encouraged to express their reaction to the training through a post-course online survey. At the third level, the front-line managers would be concerned about whether or not their subordinates completed the training and passed the WBT assessment, so they would review the OLE-generated WBT statistics. At the fourth level, Branch managers examine the larger issue of how the InfoSec training actually caused a behavioral change in the organization. To evaluate this level of effectiveness, they would compare the rate of reported InfoSec infractions prior to and after the training. Finally, based on these findings the executive managers of the CALO would want to know the amount of time saved or the amount of damage that was averted as a direct result of the online training.

Conclusion

The literature suggests that CALOs undertaking enterprise-wide business process changes could benefit from the addition of OLE technology to their training programs. First, however, the training needs of the CALO need to be clearly defined. The Training Needs Analysis (TNA) offered by O'Brien and Hall (2004) provides a systematic method of "eating the elephant," when it comes to identifying the hundreds of training needs at various levels of a CALO. Each business process should map to a corresponding section of the curriculum, which is tailored to an employee's job role, functional area, and position in the CALO.

As previously discussed, an OLE provides a flexible system for delivering content. Since training will be necessary for all employees affected by the CALO's transition, executive managers would prefer an OLE system that can deliver training on an "as needed" basis, and be scheduled around critical operations. Managers would also appreciate the ability to electronically monitor student progress in an OLE, which can provide a real-time indication of how prepared the workforce is for the upcoming transition.

Although the use of OLE technology may ease the difficulties that arise with CALO transitions, there is still much work to be done to determine exactly which kind of OLEs should be implemented in which circumstances. As Spector (2005) notes, "It is unlikely that any single instructional approach, method, tool or perspective will be appropriate for all audiences, situations, and desired outcomes" (p. 6). For this reason, the findings of some studies favor a blended learning approach (Dagada & Jakovljevic, 2004), which uses both OLE capabilities and traditional face-to-face instruction. However, Newton and Doonga (2007) emphasize the lack of research in the implementation and evaluation of corporate OLEs, and report one of the major OLE weaknesses they found: "corporate e-training did

not address strategic business objectives" (p. 127). Implementing OLE solutions for CALOs is a relatively uncharted area, but it holds great promise for the future transforming of corporate training programs.

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Designing Mobile Courses with College Instructors

Jeff Kissinger and Bill Ganza

Abstract

Developing and delivering quality access to education and training is the overriding mission of many colleges and universities. Historically this is even more so in community colleges. With the movement of traditional online courses well into the mainstream, new emergent, more flexible course models and technologies are further increasing access to quality educational experiences. One of these trends is the increased use of mobile computers for instruction. The paper describes a year-long project that employed college instructors as development partners, which resulted in six completely mobile courses.

Keywords: faculty training, professional development, mobile design, mobile learning, instructional media.

Introduction

During the 2007-2008 year, six online courses were identified for conversion to a mobile course delivery model. These courses were: ENC 1101 – English Composition I; CCJ 1020 – Introduction to Criminal Justice; SPN 1060 – Spanish I; CGS 1100 – Microcomputer Applications for Business and Economics; GLY 1001 – Earth and Space Science; and MAT 1105 – College Algebra. The particular student population was deployed military students with unique needs and characteristics, which were the guiding factors during the analysis development phase.

Traditional asynchronous distance learning courses delivered online were not an option for this student population due to their non-existent or intermittent access to Internet connectivity. A new distance learning course design that addressed this unique challenge was created that employed mobile computers, instructional media, training, and faculty discipline experts as active media developers. The focus of this paper will be on the effective use of faculty members in the development of instructional media for mobile learning environments.

Faculty Training and Certification Plan

Florida Community College has designed training to equip faculty with high quality instructional authoring capabilities across diverse platforms. FCCJ, through its research and development projects, has found that distributed learning is optimized by student engagement and interactivity. This is further supported by current learning and motivation theory (Palloff & Pratt, 2003). The training plan was focused on instructional design and production that promotes maximum student success through situated instructional design, interactivity, and student motivation flexibly tailored for this distributed student population.

Using the existing college curriculum, faculty were trained to adapt college credit courses for delivery in a complex distributed fashion, without the need for face-to-face meetings or Internet connectivity. Selected faculty are certified in each of their respective disciplines by FCCJ in accordance with Southern Association of Colleges and Schools (SACS) guidelines and regulations. All are veterans of distance and distributed learning teaching at FCCJ and other institutions across the country. Consideration for selection included experience in teaching with technology from a distance; proficiency with technology; and a thorough understanding of motivational theory and pedagogy.

The faculty workshops and training were developed and facilitated by professionals in their fields and have been tailored specifically for this project. The goal of the training plan was to help transform faculty thinking about teaching and learning in the mobile learning environment. The training was designed to provide research based knowledge about teaching and learning and opportunities to discuss the applications of such theory to a new learning environment.

Training began November 1, 2006 and was completed December 28, 2006. The training chosen for faculty was customized to address student engagement and motivation in their distributed and disconnected learning environment. The training also focused on exploiting the unique characteristics of a disconnected environment by designing instruction around situated learning experiences that pro-

mote higher order thinking and learning. Student motivation is a key design consideration for developing self-directed mobile learning activities (Sharples, 2005) as it is in the traditional online learning environment (Palloff & Pratt, 2003). To address this, the Creating Optimum Learning Environments (CREOLE) motivation training and instructional strategies and techniques developed were selected. To address the practical application of these learning theories, the faculty-training plan applied these motivation and learning theories into the media development workshops. Subsequently, experts in various instructional media authoring tools and in self-directed instructional design techniques led faculty workshops and provided ongoing support for the year of development. Training culminated with the granting of certificates from FCCJ's professional development institution, Florida Community College University (FCCU).

Leading researchers in the field, Palloff and Pratt (2005), focus on elearning strategies and techniques designed to engage students through interactivity, engagement, and media to foster learning. Complimenting this, the faculty training plan included instructional design training by Dr. Sebastian Foti, a researcher and scholar in the use of media and pedagogical agents at the University of North Florida. Dr. Foti operationalized the pedagogical theory of Palloff and Pratt by focusing on practical methods to create interactive, self-paced content for mobile devices. The twopodcasting in Garage Band and iMovie. These trainings provided faculty with the skills and abilities to author rich media assets to integrate into interactive learning activities and assignments for their mobile courses. In addition, faculty were supported throughout the entirety of the project by media authors and the instructional designers.

The Training plan focuses on the knowledge, skills, and abilities for faculty to ensure learning outcomes are met for students though quality and academic rigor. To accomplish this, the training plan was constructed around a student, knowledge, and assessment centered approach (Sharples, 2005) within a mobile course design. The focus of the training plan was driven by the curriculum and pedagogy specifically for the mobile untethered student. While the technology, mobile device, and media are very significant considerations, they have not driven the training plan or outcomes. These are important considerations, yet are considered in the periphery around the core focus of outcomes-based, mobile pedagogy. A quality effective mobile learning design employs social constructivist (Vygotsky, 1978), self-directed and situated (Stein, 1998) theories to create flexible and student-centric outcomes (Low & O'Connell, 2006). These are the principles that have guided the construction of the training plan to foster the greatest student motivation and engagement employing a combination of effective pedagogies and instructional media for student success.

The four trainings that comprise the faculty training are further described below:

- Instructional Design for Self-Paced Instruction is a new customized offering from FCCU delivered by experts in instructional design. Dr. Sebastian Foti provided a hands-on workshop to equip faculty with tools and design techniques to promote high-level student learning and motivation.
- Digital Content Authoring Training will encompass the following applications:
- Apple iMovie training will focus on creating instructional digital content to be integrated into learning assignment and course design. The training focuses on high quality media production that promotes student engagement, motivation, and learning. Faculty will have continual support beyond the initial training from media design authors.
- Apple's Garage Band training will focus on creating instructional digital content to be integrated into learning assignment and course design. The training focuses on high quality media production that promotes student engagement, motivation, and learning. Faculty will have continual support beyond the initial training from media design authors.
- CREating Optimum Learning Environments (CREOLE) is a series of four modules designed to provide instructors with the knowledge and skill to apply human learning and motivation research to the development and teaching of face-to-face, blended, online, mobile courses. It includes examples of the application of these tools to online learning in eight subject areas: biology, chemistry, mathematics, computer science, English, humanities, history, and psychology. CREOLE modules 1, 2, 3 and 4 can be taken separately for professional development. Members of FCCJ faculty will provide this course. The University of Utah, for three doctoral level graduate credits, also offers the entire CREOLE series.

  Module 1: Applying Learning Research to Create Optimum Learning Environments

  Module 2: Applying Motivational Research to Create Optimum Learning Environments

  Module 3: Developing Interactive Blended Courses

  Module 4: Developing Interactive Web-Based Courses
- Learning Management System (LMS) is a customized training for mobile course design and instructional delivery. Facilitated by the director of professional development, this training covered the uses of an LMS in the context of an untethered course adaptation. Faculty learn pedagogical techniques to adapt exhibiting online learning activi-

ties to a mobile delivery model. Example subjects include motivating students through situational learning, motivation, and distributed learning communities.

The faculty training plan as a whole provided the basic tools and knowledge required to work effectively with the instructional design teams applying instructional pedagogy and media for this learning environment. Faculty training continued through the entirety of the courseware development under the direction of the design team to ensure continuous enhancement of faculty skills and courseware design.

Means of Assessment and Certification: The faculty training certification plan draws from Western Interstate Commission for Higher Education (WICHE) Best Practices in electronically offered degrees together with the college's experience with mobile delivery practices and theories to produce effective and qualified trained instructors. The college Quality Control Representative (QCR) in conjunction with the trainers/instructors that conducted the faculty trainings, evaluated each individual component, providing compliance/quality level scores of incomplete or complete relevant to each faculty training learning outcome. A score of completion on all outcomes indicated standards have been met for the specified area.

FCCU granted faculty certification upon successful completion of all course objectives and outcomes and upon receipt of a written recommendation from the QCR and the trainers/instructors conducting the faculty training.

Lessons Learned

The feedback received from the six total faculty developers upon the completion of the mobile development training was overwhelmingly positive. When surveyed, all six of the faculty expressed their appreciation for the depth, relevance, and effectiveness of the training deliveries, which were delivered in multiple formats designed to increase faculty motivation, engagement, and access.

Due to the diverse schedules and geographic locations of faculty, the training plan had to accommodate several time zones, faculty work schedules, and locations. This was addressed by using a combination of innovative, powerful, and effective instructional training technologies that included:

- Blackboard Learning Management System version 7.1
- Elluminate Training System
- Centra Training System
- Moodle Learning and Content Management System

The feedback received after the first two course deliverables was also positive, but contained important insight for future modifications that could increase faculty self-efficacy during media development as well as overall increased course production quality. One of the faculty developers expressed a desire for training in public speaking skills to improve his media and "instructional presence". This was perhaps the most significant insight gained from the first two course developments that helped modify and shape the trainings that followed.

Future Training Modifications

During the faculty selection process there will be an added media-centric speaking audition. This audition will come in the form of interested faculty submitting a short 5-7 minute instructional script, which they will record as a video file. A committee comprised of the development, other faculty from that discipline, and the quality assurance team will then critique and review the instructional media, either accepting or rejecting their application of development interest. The decision rubric will be centered around the following criteria:

- The degree to which the media is an effective instructional asset that promotes student motivation, engagement, and learning outcomes
- Author speaks clearly and audibly
- Video is well lighted
- Setting is appropriate and contributes to learning, not distracting
- The instructional message is clear and relevant to the course and learning

During the second set of course development, MAC1105 College Algebra and GLY1001/L Earth Space Science, another significant insight into the training plan arose centering around instructor confidence. One of the instructors living three hours away in a neighboring state chose to make the trip to the college's television production studio to record some of her media. Despite the fact that this instructor successfully attended all the media, video, and instructional design trainings, she still preferred to record the majority of her media in the studio. Paradoxically, this faculty member also felt she received the necessary development skills to produce her own media, and successfully did, despite her time spent in the studio.

Summary

As the first year of development concluded, the faculty training and certification plan was viewed as an overall success based on the faculty developers' post training perceptions and the quality of the courses delivered. Despite this perceived success, important insights and challenges were revealed during the first year of development; these include:

- Faculty desire for "talent" speaker training
- Need for audition step in selection process

- Varying levels of faculty developer self-efficacy and confidence as it relates to instructional media authoring.
- Need to flexibly meet faculty media authoring needs

There is perhaps a need to add some training on best practices and techniques for faculty speaking, which was not initially a consideration for this development project. This may result in higher quality instructional media and higher faculty self-efficacy as it relates to their media authoring skills. Secondly, as part of the faculty selection and certification process, there is a need to implement a new "audition" process that evaluates the candidate's skills and ability to author effective, quality instructional media. Lastly, as the development of effective instructional media is a new skill that must be mastered for faculty to competently author quality instruction for mobile learning environments, their self-efficacy must be taken into account during the development process to foster their success and quality development outcomes. As a result, the production team must continuously be flexible and responsive to the faculty developer's needs and provide continuous support.

Implications

This training plan could be modified and implemented for other development initiatives or professional development programs. Faculty were trained on how to create instructional media as well as how to effectively apply its use for teaching and learning. While it is not expected that faculty will be transformed into media authoring experts, there is however a need to give them the skills necessary to create and foster rich, interactive, learning experiences that encourage critical thinking for the modern world in whatever learning environment. It is the hope of these researchers that institutions and colleges will continue to invest in innovative professional development and faculty training programs that increase their ability to engage learners across mediums.

From this project we learned that faculty thinking about course development can be transformed. Once old ways of thinking are transformed, pedagogical practices can be altered and faculty can devise new ways to engage students in learning. Future training will need to continue to transform the ways faculty think. The implications reach beyond this project as teaching and learning continues to change. The days of faculty lecturing to rooms filled with anxious students has long passed. Students of the future will need to be engaged in ways that are today unknown. Teaching and learning continues to change and faculty will need to find ways to engage students. New technologies and learning environments will continue to emerge and those in academia will have to adapt to the needs of the students. Faculty development programs, we believe, are the root to helping faculty adapt to changes in teaching and learning to ultimately best serve students.

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e-Learning Central: A Comprehensive Solution to Meeting the Continuing Education Requirements of a Health Care Provider

Cindy Brewer, Alison Graham, Stephanie Geckle, and Kevin J. Brown

Abstract

Beginning in 1998, Orlando Regional Healthcare (Orlando Regional) took its first steps toward migrating from instructor-led continuing education for health care providers to an e-Learning solution. In 2007, Orlando Regional provided 46,494 e-Learning completions in 39 courses that are all designed, developed, and maintained by Orlando Regional's in-house e-Learning Team. The success of this project is due to a carefully conceived development plan, the support of Orlando Regional management, and the goal of the e Learning Team to become vendor independent by the end of 2005.

Keywords: Health Care, Online Testing, Trainee Management

Project Background

In 1998, Orlando Regional purchased its first e-Learning program to provide annual regulatory education to team members (employees) and contractors. This solution proved unsatisfactory due to problems with usability and lack of customization to unique needs of the organization. Orlando Regional remained committed to an e-Learning solution and collaborated with SunTech 3 in 1999 to create an annual mandatory education program that could be customized and altered by in-house staff. This project was LAN-based and provided no automated recordkeeping capability. This system expanded to include multiple courses and met the needs of Orlando Regional until 2004.

2004 presented multiple challenges to Orlando Regional's small e-Learning department. Two of the three department members left the organization. The new staff consisted of experienced nurses and educators who had no prior skills in programming or e-Learning design. At the same time, the organization was requesting an increased number of courses, and it became clear that the current system of recordkeeping was not sufficient to meet the organization's needs.

In late 2004, Orlando Regional and SunTech 3 devised a project development plan with four primary goals as follows:

- Formation and training of a new e-Learning Team due to turnover
- Technology update to leverage web-based delivery
- Decrease the development time for e-Learning based courses
- Achieve contractor independence

In early 2005, Orlando Regional and SunTech 3 began to construct a new e-Learning development and delivery system for the corporation. The result was e-Learning Central, a single portal to e-Learning for all Orlando Regional facilities. The new system was deployed in the fall of 2005, and all existing courses were converted to be compatible with the new system. The application ran smoothly with approximately 45,000 course completions during the first 15 months.

Staff Development Requirements

In order for the e-Learning Team to be able to create, maintain, and modify the new system without continuous support from an external vendor, the Team needed to know the system intimately from the inside out. The Team felt that this would be best accomplished if they built the system themselves. In this arena, the Team faced a significant barrier.

The e-Learning Team consisted of two experienced health care practitioners and an administrative support person. The content development skills of the staff were not up to the task. They had attended beginner and advanced training courses for Authorware, but they were simply too inexperienced in e-Learning design, development, and production.

To remove this barrier, Orlando Regional and SunTech 3 formed a synergistic alliance that combined intense training of the Team with the concurrent development of e Learning Central. Orlando Regional contracted for SunTech 3 to provide time spent at the Team's site, rather than for a specific finished product. SunTech 3 provided the ser-

vices of Dr. Brown who worked side-by-side with the e-Learning Team at Orlando Regional, instructing as well as developing the new system over a period of several months. During this period, the Team became proficient in Authorware construction and scripting, database design, SQL for use in ASP pages that would form the middleware with the personnel management system (PeopleSoft), visual design, and project management skills. In response to the growing demands for the department's services, the administrative assistant role evolved to an e-Learning associate role, which included more e-Learning responsibilities such as database management, html scripting, and ASP page development. By the time e-Learning Central was deployed, the Team was fully able to develop, troubleshoot, and modify all aspects of the new system independently.

Program Design Requirements

Due to system and design constraints in the original system, user training records were exported to individual CSV files and sent via FTP to a holding site on the server. From there, manual intervention was necessary to input course completion data into PeopleSoft. The need for manual intervention created a delay in the posting of online training to PeopleSoft. Courses were located in more than one place, causing confusion for users trying to find a specific course. Additionally, the log-in format was not secure; it utilized a single password and could not authenticate users against IS security groups. The old system also limited reuse of content because the code for FTP calls and other behind-the-scenes functionality was intermingled with the code for content and interactions. After consulting with SunTech 3, the e-Learning Team recognized that production time could be significantly reduced if a library of reusable program elements could be created.

After researching vendor provided Learning Management Systems, Orlando Regional decided that the new e-Learning application would need to communicate directly with current PeopleSoft team member records in real time, provide a secure log-in, support use and re-use of previously developed course content, and allow for assignable curriculums as well as on-demand enrollment. The application would need to be accessed internally via the corporation's intranet and available on all computers connected to the intranet.

Thus, e-Learning Central was created. The application was customized to only what was desired and needed for Orlando Regional, which helped keep the project cost-effective for the organization. E-Learning Central functions include a single point of access to all e-Learning programs, data record storage and retrieval from PeopleSoft, and a display of customized courses for each user. Once the user gains access to e-Learning Central, the dynamic individualized display lists the courses that have been assigned, are in progress, or have been completed within the current and previous calendar year for that user. The user is also able to choose courses from a comprehensive course listing at any time, allowing the individual to partake of whatever content interests him/her and aligns with his/her professional goals.

These functions are mirrored for non-team members who are required to complete programs available on e-Learning Central but do not have team member records in PeopleSoft. The non-team member records are stored in a SQL database that resembles the same tables within PeopleSoft. Determination of whether the user is a team member or non-team member occurs from the log in. The team member log in obtains the 6-digit identification number and verifies it in PeopleSoft. Non-team members have an identification number of 5 digits. Branching to the appropriate tracking database (PeopleSoft or non-team member SQL database) for retrieval of user demographics and record insertions and updates occurs based on the character count of the user id number.

Orlando Regional chose to maintain the "look and feel" of the previous in-course navigation system because it was familiar to its users and functioned well. Keeping navigation familiar helped users transition more easily to the new system. The navigation system allowed the user to move forward and backwards within the program and to set a general bookmark. A more accurate bookmark routine was created within the new system.

The one aspect of navigation from the old system that didn't work well was a strictly linear presentation of course content. All courses could only be run from beginning to end; this was suitable for initial presentation of a course but blocked users from quickly returning to a particular section for review or reinforcement. The new system structured all courses as a "starter" that contains a menu of lessons. Selection of a lesson from the menu launches a smaller "out" program that contains a single lesson with its associated test; successful completion of the course requires completion of all "out" programs. The main menu allows users to repeat a lesson at will—it also allows users to return to a previously completed course to access a specific lesson for reference when they need it, essentially using that lesson as a job aid.

While the old system gave users a chance to enter written comments, the new system includes a complete course evaluation and immediate access to a printable certificate of completion. The certificate can also be accessed during that calendar year for reprinting in case of loss, a feature not previously available.

It is possible to assign courses and curriculums in several ways. Courses mandated by the corporation for large numbers of team members are preassigned upon hire and annually within PeopleSoft. Courses required by a particular manager for one or more team members within their department(s) are assigned directly by the manager using Managers Options, a toolset only accessible to those in an Active Directory management security group. Managers can also view and print team members' e-Learning course records. These reports can be generated for entire departments, specific job codes within a department, and individual team members. Instant posting of training progress to PeopleSoft and dynamic loading of displays based on current PeopleSoft data means managers always see the most current data available. The assignment functions do not block users from accessing courses on their own.

Another customized feature of e-Learning Central is the capability to collect and report program-specific data. Continuing education information for nursing is collected and reported to CE Broker, Florida's regulatory tracking system for licensed professionals. Additionally, programs that require various levels of content per job description can be customized and accessed from one course title. Determination of the content presented to the user can be based on typed responses from the user or demographic data pulled from PeopleSoft such as job code or department number. For example, a nurse may need to complete three levels of training, whereas a person from accounting may need to complete one level of training. The branching of levels occurs behind the scenes and is not visible to the user. The level of training is then recorded on the certificate.

Although the Information Services (IS) department was an important partner in planning the functionality of the application, little assistance was required for the creation of e Learning Central. Their assistance included development of a secure log-in application that would authenticate the user in Active Directory and initial set-up of the SQL database. Since PeopleSoft was already being used to store training records prior to the development of e-Learning Central, most data was stored in or retrieved from existing tables. Only one customized table was needed and created for data storage. The bulk of the data processing operations occur within the e-Learning Central application or the courseware.

Development Time

Prior to development of e-Learning Central, certain design guidelines were established. Development time was also taken into consideration, as e-Learning Central was to be developed within a couple of months. The team determined that a method for rapidly converting existing courseware to be compatible with the new system would be essential to avoid delays in production of new courseware that had already been requested.

With SunTech 3's guidance, Orlando Regional elected to create uniform course templates to facilitate rapid development. The templates provided the needed framework for all content presentation, recordkeeping functions, and uniform navigation based upon existing courseware. Course content is "dropped in" to the standard template, allowing the e-Learning Team to focus on creation of meaningful interactivity rather than navigational and recordkeeping issues. The Team's attention is now primarily directed toward increasing the interactivity of programs, moving more towards simulations, games and self-customization of content. These activities contribute most to the department's mission of providing online courses that help team members provide the highest quality care for the patients.

Reusability of developed structures and content was deemed to be essential for two main reasons. First, a large segment of courses are annual training courses required by regulatory agencies, such as Joint Commission (an accrediting health care organization) and OSHA (Occupational Safety and Health Administration), and need to be updated on an annual basis. The re-usable capabilities developed within the framework of each program have enabled the Team to efficiently vary these programs so they are more interesting to users. This is achieved by changing backgrounds, colors, buttons, and themes for programs that would otherwise seem bland year after year. Second, some chunks of content need to be presented uniformly in multiple courses or be available for use as a just-in-time job aid.

Many of these out programs demonstrate skills specific to nursing and can be reusable in many programs. With a library of these small lessons, development time is reduced, and recreation of content that is present in another program is not necessary.

The e-Learning Team recognized that after successful deployment of the redesigned system, the demand for new course content would increase. This meant that design and development process time would need to be shortened in order to produce new courseware efficiently. The Team initially believed that the use of the new templates would fill this need. The requests for customized content by various departments, both clinical and non-clinical, from within the corporation did indeed notably increase. The Team noted that many requests did not result in completed storyboards because the storyboarding process was unfamiliar and intimidating to content experts. Subsequently, a streamlined process was put in place for submitting content and

storyboards. With a simplified process in place, more subject matter experts were willing to develop storyboards. Many subject experts also lack the time to write the content, let alone explain the details of basic nursing concepts that may be included in the content. The e-Learning Team consists of nurses who are very familiar with the subject; thus, modifications to a storyboard can be made with little explanation from the subject matter experts. Familiarity with clinical nursing also allows creation of unique interactive lessons that would not otherwise be included, and this greatly improves the satisfaction of the subject matter experts and users.

The increased number of requests for course development spurred the development of a priority scheduling system. Highest priority is placed on requests that benefit patient safety or are required by a regulatory agency. Development of simple information programs with little interactivity generally takes less than 30 days to complete, while production time for a new interactive program takes approximately 90 days once the content is submitted. The simple informational programs, referred to as an "E-Info," are submitted as a PowerPoint presentation and are imported using Captivate. The Authorware code permits the user to bookmark the program. The target audience and number of participants that would be taking the program are a factor when considering development of a comprehensive, interactive program. In order to justify the amount of development time, a standard amount of 300 participants who need to complete the program annually is necessary unless no other form of education is available. Consequently, the e-Learning Team has informally become an internal consultant in determining best methods of training.

Contractor Independence

Since 2005, the e-Learning Team has accomplished a significant number of goals for a department of just three team members. Currently, the e-Learning Central catalog consists of 39 internally developed programs (an average production of one program a month). During the mentorship, the Team acquired an increased knowledge of the authoring tools (Authorware, Captivate, and Flash) that enabled them to produce more meaningful and interactive content that was not available beforehand. Examples of the interactivity within the programs included increased use of video and photographs, virtual clinical tools (syringes, pumps), custom Flash animations that highlight physiology or demonstrate clinical processes, and simulations that provide individualized feedback for patient scenarios, nursing documentation, and software applications. Comments from users are very positive and include many statements on how they understood the content better and could apply it to their job. In addition, instructors have recognized that users who had completed e-Learning programs were able to apply the content that they learned during critical thinking scenarios related to the topic, whereas others who did not receive the same training were not able to recognize pertinent information.

A few of the courses utilizing advanced interactivity include:

- **Insulin**

This comprehensive and highly interactive program reviews all the available insulin preparations; their actions, indications and risks, and safety measures used at Orlando Regional to reduce medical error related to insulin. Special features include clinical scenarios, a virtual syringe used for accuracy exercises, Flash animations, and extensive custom photography and graphics.

- **Stroke Care**

This thorough and highly interactive program for licensed healthcare professionals reviews the physiology, diagnosis, and treatment of stroke using interactive scenarios, custom graphics, and Flash animations. A golf game houses the evaluation for each lesson with the goal of "reducing the number of strokes."

- **Trach Care**

This program reviews the equipment and procedures used in the basic care of patients with tracheostomies and culminates with clinical simulations that require the user to correctly prioritize actions based on patient presentation. Extensive use of video and photography of simulated patient situations adds to the realism of a course used by both physicians and nurses.

Customized media development is another skill the e-Learning Team gained. Clipart is customized to represent components of nursing procedures. The customized clipart is also used in animations utilizing Flash for demonstration of nursing procedures or to explain pathophysiology. Additionally, small video segments are included in some programs. Some video segments show a demonstration of a procedure, while others are used as an interactive lesson for deciphering a demonstration performed correctly or incorrectly. A streaming server is not available, so video is compressed using Flash software.

Custom media development is used extensively in these courses:

- **Phlebotomy**

The Phlebotomy program reviews policies, techniques, and processes used for drawing blood at Orlando Regional. Extensive use of photography, video, and interactivity ensures that users understand all essential information before reporting to the skills lab for hands-on skills demonstration.

• **Basic Asepsis**

The Basic Asepsis course provides basic information about sterile technique for opening sterile supplies in the operating room. Extensive use of video and interactivity allows users to view correct technique and discriminate between correct and incorrect actions during the evaluation.

As a result of the complete immersion and knowledge of e-Learning Central, almost all unexpected problems or issues that were encountered were repaired independently by the e-Learning Team. Some of the issues that were unforeseen related to problems outside of e-Learning Central, such as network speed, and required collaboration with the IS department to investigate the source. Since a positive relationship had been developed with the IS department during the creation of e-Learning Central, the Team was regarded as a credible comrade when the request was presented. This relationship was not present prior to the development of e-Learning Central and has proved an invaluable asset as the Team has pursued more ambitious projects.

In 2007, the e-Learning Team once again partnered with SunTech 3 for the creation and development of an online testing center. This application allows team members to create and take multiple choice tests via the intranet. Questions are imported or typed into a form to insert into a SQL database table. Once stored in the database, the questions can be retrieved in an organized manner by category, author, or index number. Various levels of tests can be constructed using the question bank. Educators can generate reports of test scores, test analysis, and question analysis; additionally, they can access various administrative functions. The conception of the Online Test Center was created with the assistance and guidance provided by SunTech 3. The time to create this application was shorter than average because the e-Learning Team was able to plan and build large portions of the application independently. Furthermore, after the Online Test Center was created, requests for changes and enhancements to the program specifications were accomplished independently because the Team was so intimately familiar with the source code. Hence, the Online Test Center is an application that is completely customized to the corporation's needs and requests.

Looking Ahead

Future endeavors will be focused on developing programs that are even more highly engaging with interactivity and simulations. As users have been exposed to programs that are informational only (E-Info), they compare these programs to the interactive programs and see the stark difference. The E-Info serves its purpose as an educational tool that is developed in a quick and timely manner; however, the users are more accustomed to the interactivity contained in the bulk of the programs on e-Learning Central. Despite the availability of programs with quick turnaround time and easy development, the demand for highly interactive programs is more prominent. Users are more able to apply the content learned in an engaging program to the job at hand. Consequently, the culture towards learning has changed to one that requires meaningful e-Learning programs.

As technology changes, the capabilities within e-Learning Central are very flexible and can be altered to fit into different systems. It remains a viable solution for maintaining training records, which can be easily migrated to an advanced system as one becomes available. Furthermore, the skills of the e-Learning Team have developed in such a way that future technology shifts will be more easily implemented.

Conclusion

In conclusion, the empowerment created by Orlando Regional's relationship with SunTech 3 has provided the e-Learning Team with the confidence to not only continue to develop original and customized programs, but also to independently enhance and modify two major applications: E-Learning Central and the Online Testing Center. The training needs and testing assessments that are a requirement for the team members of Orlando Regional Healthcare to complete is accomplished through these modalities.

Appendix — Course Descriptions

Interactive Programs

Acute Care RN Clinical Ladder - This course delivers information about the Clinical Ladder to nurses and their managers. The program recognizes users in the manager's security group and delivers additional content to them automatically.

Age Specific Care - All nurses must be competent in delivery of age-specific care. This course provides basic information on the needs of specific age groups and must be completed before evaluation of bedside skills.

Barcode Labeling - A short course on the use of barcode labeling for laboratory specimens, this course reviews the contents of the label, how it is applied to various specimens, and basic maintenance and troubleshooting of the label printer. The course uses extensive interactivity and use of custom photography.

Basic Asepsis - The Basic Asepsis course provides basic information about sterile technique for opening sterile supplies in the operating room. Extensive use of video and interactivity allows users to view correct technique and discriminate between correct and incorrect actions during the evaluation.

Bed Tracking - A short course for clinical and environmental staff on the use of the telephone bed tracking system used at Orlando Regional facilities, this course allows virtual performance of the tasks required by the bed tracking system.

Blood Administration - This course reviews the policies and safety methodology for blood administration at Orlando Regional facilities, and is required of all staff that plays a role in the handling and administration of blood products for transfusion. The course contains a high degree of interactivity and custom Flash animations.

Bloodborne Pathogens and Bloodborne Pathogens Makeup - OSHA requires that all staff who may come in contact with blood or body fluids receive annual safety education on bloodborne pathogens such as HIV and hepatitis. This course uses Flash animations and interactive assessment of staff's ability to take appropriate precautions for a given set of clinical scenarios.

CARE (Corporate Annual Required Education) - CARE must be completed by every team member each year. It meets regulatory and corporate requirements for education on: risk management, code of conduct, compliance and ethics, infection control, transmission-based precautions, fire safety, emergency preparedness, and standards of behavior. Annual theme changes keep the product looking fresh to users, and Flash animations and interactivity spice up bland content.

Hazardous Materials - Geared primarily to Emergency Department staff, the course covers the various types of hazardous materials, how they are transported, health hazards associated with them, required protective equipment, and appropriate decontamination techniques. Extensive use of photography and interaction help hold the users' interest.

HIPAA - The HIPAA course provides education about federal laws regarding privacy and portability of healthcare information and the policies and processes used at Orlando Regional to comply with those laws. The course is divided into levels based on the type of healthcare information the user deals with in his or her job, and record-keeping is customized to reflect the level completed.

Insulin - This comprehensive and highly interactive program reviews all the available insulin preparations; their actions, indications and risks; and safety measures used at Orlando Regional to reduce medical error related to insulin. Special features include clinical scenarios, a virtual syringe used for accuracy exercises, Flash animations, and extensive custom photography and graphics.

Isolation Procedures - Isolation of patients with contagious diseases is a critical step in preventing the spread of infection through the hospital. This program reviews the processes and techniques used to protect caregivers and patients from exposure to communicable diseases at Orlando Regional.

IV Therapy - This course reviews proper techniques for insertion and maintenance of peripheral intravenous access to prevent common complications of therapy. Interactivity incorporates clinical scenarios and the use of custom video and photography.

Moderate/Deep Sedation - Patients need to be sedated for a wide variety of procedures while in the hospital. This course provides essential information on medications used for sedation, potential risks and side effects of sedation, and the nursing care and monitoring required to minimize those risks. The program presents several interactive clinical scenarios that require clinical judgment and correct medication calculations.

Orientation Road Trip - This program must be completed by all new hires within the first 90 days of employment. Orlando Regional's orientation process uses a travel theme; this program delivers the same education provided in CARE, housed in a theme more consistent with the overall orientation process.

Pain Management - Appropriate pain management is an essential component of quality healthcare; intended for licensed healthcare providers, this program provides basic information on pain, its assessment, and treatment. The program includes interactive clinical scenarios and a virtual patient-controlled analgesia (PCA) pump used for both instruction and evaluation.

Peer Interview - Human Resources at Orlando Regional Healthcare uses behavior-based interviewing techniques with applicants. Intended for non-HR team members who participate in the peer interview process, this program provides information about behavior-based questions and allows users to practice interviewing candidates in a virtual environment.

Phlebotomy - The Phlebotomy program reviews policies, techniques, and processes used for drawing blood at Orlando Regional. Extensive use of photography, video, and interactivity ensures that users understand all essential information before reporting to the skills lab for hands-on skills demonstration.

Recognizing Sepsis - Required for all clinical nurses, this program is part of the Surviving Sepsis Campaign at Orlando Regional. This highly interactive program reviews the significance, pathophysiology, diagnosis, and treatment of sepsis and severe sepsis and the order sets and screening tools used in the care of patients with these disorders.

Restraint - This program reviews the laws and policies that apply to the use of restraints and practical information on safe and appropriate restraint use. Interactive scenarios both instruct and assess competence in the safe use of restraints.

Stroke Care - This thorough and highly interactive program for licensed healthcare professionals reviews the physiology, diagnosis, and treatment of stroke using interactive scenarios, custom graphics, and Flash animations. A golf game houses the evaluation for each lesson with the goal of "reducing the number of strokes."

Trach Care - This program reviews the equipment and procedures used in the basic care of patients with tracheostomies and culminates with clinical simulations that require the user to correctly prioritize actions based on patient presentation. Extensive use of video and photography of simulated patient situations adds to the realism of a course used by both physicians and nurses.

E Info - Designed as a rapid solution for content that is informational in nature, E Info programs are not interactive. An E Info can be deployed in 1/3 the time of a traditional interactive course and offers the same recordkeeping benefits.

Bariatrics - Information on the care of patients undergoing gastric banding and similar procedures.

Bed Tracking APH/WPH - Site specific information on the bed tracking system at Arnold Palmer and Winnie Palmer hospitals.

Bed Tracking Dr. Phillips - Site specific information on the bed tracking system at Dr. P. Phillips Hospital.

Benefits Education - Information for team members changing from a non-benefits eligible position to a benefits-eligible position.

IV Admixture - Photo-based information for nurses about proper technique for admixture of intravenous medications.

Med Verification Form - Review of the use of a new medication verification form.

OR Procedure Times - Information about how to record OR procedure times in the clinical information system.

Pediatric Asthma - Review of the new Pediatric Asthma core measures, this presentation is a precursor to a more interactive course slated for later development.

Recognition Tracking - Information for managers on how to track rewards and incentives for tax purposes.

Surviving Sepsis - Introductory information about the Surviving Sepsis Campaign at Orlando Regional, this program provided immediate information during the development of an interactive program, and continues to provide basic information on sepsis for non-licensed staff.

Synergy Model - Basic information about Orlando Regional's Nursing Philosophy and the Synergy Model.

Writing Policies - A basic guide for team members tasked with writing policies for the organization.

About the Authors

Dr. Kevin J. Brown has been the Vice President of Program Development for SunTech 3, Inc. since the company was founded in 1989. Dr. Brown has been involved in Adult Education and Training since 1977 and directly involved with computer based learning since 1982. Since that time, Dr. Brown has been involved with the design, development, and implementation of over 650 computer based training programs for client companies worldwide. In addition, Dr. Brown is an Adobe Certified Training Provider and teaches design and development techniques using Authorware, Flash, RoboHelp, and Captivate.

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Alison Graham, RN, BSN, CCRN is an Orlando native, and received her BA in biology from Rollins College in 1986 and her Bachelor of Science in Nursing from the University of Central Florida in 1989. She worked as a staff nurse specializing in the care of critically ill patients with cardiac disease for ten years. For the next six years she taught critical care nursing both at the bedside and in the classroom at Orlando Health (formerly Orlando Regional Healthcare) facilities. Since 2004 she has been writing, designing and programming eLearning for Orlando Health.

Stephanie Geckle has worked in E Learning for seven of her nine years at Orlando Health. She has an AS degree in Computer Information Technology with a specialization in Internet technologies.

Alternatives in Instruction Delivery: A Commentary on the Systems Approach to Education

Introduction

Education, possibly more than any other discipline, occupies a hallowed place in our civilization and comes by this with a provenance that goes back for millennia. Marcus Vitruvius Pollio wrote in the first century BC:

"It is related of the Socratic philosopher Aristippus that, being shipwrecked and cast ashore on the coast of the Rhodians, he observed geometrical figures drawn thereon, and cried out to his companions: 'Let us be of good cheer, for I see the traces of man.' With that he made for the city of Rhodes, and went straight to the gymnasium. There he fell to discussing philosophical subjects, and presents were bestowed upon him, so that he could not only fit himself out, but could also provide those who accompanied him with clothing and all other necessaries of life. When his companions wished to return to their country, and asked him what message he wished them to carry home, he bade them say this: that children ought to be provided with property and resources of a kind that could swim with them even out of a shipwreck."

"These are indeed the true supports of life, and neither Fortune's adverse gale, nor political revolution, nor ravages of war can do them any harm. Developing the same idea, Theophrastus, urging men to acquire learning rather than to put their trust in money, states the case thus: 'The man of learning is the only person in the world who is neither a stranger when in a foreign land, nor friendless when he has lost his intimates and relatives; on the contrary, he is a citizen of every country, and can fearlessly look down upon the troublesome accidents of fortune. But he who thinks himself entrenched in defenses not of learning but of luck, moves in slippery paths, struggling through life unsteadily and insecurely."

"Epicurus, 341-270 BC, in much the same way, says that the wise owe little to fortune; all that is greatest and essential is under the direction of the thinking power of the mind and the understanding."

This type of testimony, over the years, has come to be accepted and identified with the public schools and universities. While these hold the monopoly position in terms of funding and legislative fiat, one of the first considerations is to question the necessity for this concept to be accepted. To that point, I think it is useful to review an assessment that was made in a number of conferences that took place in 1969, some four years after the vistas of the new world of learning technology were opened to us.

In Cuernavaca, Mexico, from January 19 to April 25, 1969, a series of 16 seminars were conducted looking at alternatives in education and more importantly, getting at the social issues which act as mechanical barriers to the introduction of technology. This remarkable set of conferences produced perceptions at large variance with those generally held. For example, they found that "Schools....keep two-thirds of the world's children out, and make early dropouts of most lower class children who manage to get in. Most of those who nominally succeed in school learn mainly how to beat the system, or otherwise conform to it." They observed that "schools although dominant everywhere, perform no function which is not also performed by other institutions. The upper class clearly depends to a great extent on existing alternatives to schools. The lower class has only marginal access to schools, and must look elsewhere in order to receive that which schools offer. Even the more concerned and discriminating members of the middle class make extensive use of options to the school system."

More astonishingly, they found that schools prevent equal educational opportunity and prevent as much education as they provide. They said:

"We conclude that schools inhibit as much learning as they facilitate, and that as many students are hurt as are helped by schools. This is a strong indictment. It is not directed at all educational institutions, but at those whose structure is dominated by a graded curriculum, especially if this curriculum is itself part of a larger curricular system which pervades the society. This last point is important.

While the size of the school system does not affect the definition of either school or graded curriculum, it does greatly affect the impact of both upon the student. The dropout from a school of beauty culture, no matter how meticulously its curriculum proceeds from pedicure to wave set, has learned merely that beauty culture is not for her. Nor is the dropout from an isolated course in atomic physics much worse off. A dropout from a general school system, on the other hand, has learned that the good things of his society are not for him — and probably also that "he does not deserve them." While the basic flaw of the graded curricular school system is its subordination of learning to other objectives, the effects of this flaw are enormously magnified when the school system controls access to the society's occupational and status structure, and when it achieves monopolistic control of educational resources."[1]

The foregoing are challenges to our ability to find alternatives and the concept of the alternatives is the subject at issue in these pages.

It is important to understand the place for systems and technology, and the shortcomings of the present modality upon which technology can have little or no impact. For example, food delivery services are a significant factor in current public education budgets. While much has changed in the popular perception of food for healthy living, a recent study by the USDA Food and Nutrition Service found that only 1 school in 100 met government guidelines for maximum fat in the diet. And only 1 out of 545 schools surveyed met the guidelines for saturated fat.

And, as will be discussed, the proposed national educational goals that deal in perceptions - "competency in challenging subject matter" or, to quote Albert Shanker, "Outcome Based Education (OBE)" consists of vague statements. . . . with standards that give students, teachers, and the public no clue as to what is expected." He cites one state outcome which asks students to "create products and make presentations that convey concepts and feelings."

Enter to Learn, Go Forth to Serve was a frequently adopted class motto in the public elementary schools of the first half of this century. The motto of the William Penn Charter School is "Good Instruction is Better than Riches." One requisite of the system is that aims, purposes, or outcomes be specified. The issue to be addressed in this commentary on education systems is mainly addressed to the issue of instruction in basic types of information generally grouped under the heading of coping behavior.

Alternatives are made possible by the use of technology which is now available, and which is able to permit changing the traditional model, with all of its perceived shortcomings and failures. The potential benefits are many. They include instruction geared to the learner in a manner which the learner can comprehend, delivered at a pace consistent with the learner's ability to understand. In addition, distance learning can take place so that it will not be necessary for the learner to gather with others at an appointed time or at a preset location, under the supervision of a teacher (who also serves as the instruction manager, the information storage medium, and the vehicle for implementation of an interactive environment). Curriculum replication as needed can be accomplished with minimal cost of distribution, schedules can be adjusted to individual needs, and national priorities for skills development can be provided a quick response with effective follow-through. The technology promise includes the opportunity to raise all to a higher level and provide greater opportunities for service participation and personal growth of the individual.

The appropriate application of systems principles will be needed to implement these alternatives.

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1. Reimer, E "Second Annual Report of the Seminar on Alternatives in Education," Cuernavaca, Medixo, 69.09, p. 1, Doc 69/167 Centro Intercultural de Documentation APDO. 479, Cuernavaca, Mexico.

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The *Journal of Instruction Delivery Systems (JIDS)* is a quarterly publication devoted to the issues, problems, and applications of instructional delivery systems in education, training, and job performance. Its purpose is to inform managers, senior professionals, and developers of specific examples of applications of technology based learning systems for education, training, and job performance improvement in terms of results that can be or have been achieved. The publication is application oriented and not focused on the technical aspects of design and development. The readers should get information directly applicable to their jobs. Articles are invited that examine some phase - technology, evolution, planning, cost, learning successes and failures - of contemporary delivery systems, in line with the foregoing.

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- Use headings to organize your article.
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