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Webquests: Improving military training through constructivism and the web

Brian Patrick Lafferty

WEBQUESTS: IMPROVING MILITARY TRAINING THROUGH CONSTRUCTIVISM AND THE WEB

A Project

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ABSTRACT

The goal of this project was for members of the United States Marine Corps to leverage the benefits of inquiry based learning in the form of WebQuests. By creating and implementing WebQuests to meet training needs at the small unit level, noncommissioned officers can take advantage of the resources of the World Wide Web in a timely and effective manner. To this end, a course of computer-based training was designed, developed, tested, implemented, and evaluated using the ADDIE instructional design model. Volunteers at the Marine Corps Communication-Electronics School who implemented this training found that while the training equipped them to create and use WebQuests they were unlikely to create their own. The conclusion drawn from these results is that the project underestimated the need to address organizational change in proposing such a significant change in pedagogy.

ACKNOWLEDGMENTS

I thank the many people who lent their time and talents to making this project successful. I especially appreciate the efforts of Jennifer Cooper, Rob Fleck, Martin Cox, Joe St. Onge, Ted Drennan, Leonard Weber, and J. D. Walker. I thank my professors, especially Dr. Baek and Dr. Newberry, for their wisdom and dedication.

DEDICATION

This project would not have been possible without the support of my wife, Lisa. Her encouragement and patience throughout this process means everything to me. I dedicate this project to her and I acknowledge her dedication to our sons, Ian, Nathan, and Nicholas.

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CHAPTER ONE

BACKGROUND

Introduction

The opening chapter of this project offers an overview of the project including its purpose and significance. Limitations and operational definitions are presented as well.

Statement of the Problem

Historically, military training uses a behaviorist approach, and Department of Defense instructional design practices and doctrine are rigidly positivist (Anderson, 1986). Assembling a weapon, lubricating a vehicle, and drilling a platoon are all tasks that lend themselves to the application of behaviorist theory. The author's observation is that this situation is becoming increasingly problematic as the nation increases its expectations of service members in the cognitive and affective domains. "Understand Arab culture" and "Affect the rules of engagement" are examples of tasks that can't be broken down into simple component behaviors and mastered through drill and repetition. These cases, and countless others, call for a constructivist approach to

learning. Authentic learning scenarios that enable the trainee to construct his or her own understanding will, in the author's opinion, yield better results in a military that can no longer rely on automatons. This problem is compounded in the services' training bureaucracies where the time it takes to develop and implement new or revised training is measured in years rather than months or weeks; the pace of traditional instructional design can not keep up with changes in policy, requirements, and technology.

Purpose of the Project

The purpose of this project is to implement a way for noncommissioned officers in the United States Marine Corps to use WebQuests in addressing the issue of latency in training development and to apply constructivist learning principles where drill and repetition have fallen short.

Significance of the Project

This product was initially intended to offer an additional tool to marine noncommissioned officers (NCO's) who carry the burden of developing their subordinates. There is potential for the use of this

product to grow both vertically and horizontally. Vertical growth would span the rank structure and horizontal growth would expand the use of WebQuests into the other services. Vertical growth through the ranks may be achieved not only through the normal processes of socialization but also by WebQuest users and adopters carrying it with them as they themselves advance their careers through promotion. Horizontal growth among the various services would likely be due to the widespread implementation of knowledge management within the Department of Defense. Knowledge management vehicles such as Army Knowledge Online, Defense Knowledge Online, and the Air Force Portal facilitate the sharing of explicit and tacit knowledge among communities of interest. The military training communities of interest are a likely path for this project to spread among the services. Moreover, specific WebQuests may spread among the communities of interest by subject matter as well.

Limitations

During the development of the project, a number of limitations were noted. These limitations are the following

1. Like many real-world projects of this type its hard deadline forced a less than ideal treatment of summative evaluation. No longitudinal examination of graduates' behavior or attitudes was possible. Even 90 day follow-up surveys with participants were ruled out due to the aggressive timelines enforced by the academic bureaucracy. Due to these constraints the summative evaluation mechanism was limited to predictive surveys.
2. The delivery platform was limited to Microsoft PowerPoint. This forced compromise resulted from scaling back the project from a Web-friendly Flash product created in Articulate Presenter. The Articulate suite needed to undertake a project such as this was available at the outset of the project, but this was not the case in the later phases. Articulate proved to be cost prohibitive so the PowerPoint output was deemed acceptable so long as it was tested, revised, implemented, and evaluated. PowerPoint content can be successfully delivered via broadband Internet and can even

be viewed in a browser so long as Internet Explorer is used. PowerPoint is notorious for very large file sizes, especially for a multimedia-rich product such as this. Depending on the system used and bandwidth available, compact disc may prove a more useful delivery approach than the Internet. This situation is not a limit on the instructional design and development process, but it represents a gap between what had been planned and what could be achieved with the resources available.

3. Another area where there was an observable gap between the vision and the result was the incorporation of audio elements into the course. The vision of a course fully complemented by audio narration was achieved, but the quality of the audio was markedly lower than that found in comparable professionally produced courses. The audio quality is limited to what could be achieved through best effort. The procedures and practices used are detailed in the Development section of Chapter Three.

Definition of Terms

The following terms are defined as they apply to the project.

1) Marine: Presented here as a common noun like soldier and sailor, the term marine is a familiar form of United States Marine and always refers to a member of the United States Marine Corps.

2) WebQuest: An inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the Internet, optionally supplemented with videoconferencing (Dodge, 1995).

CHAPTER TWO

REVIEW OF THE LITERATURE

Introduction

For this project, a three-pronged review of the literature was conducted. Mining the literature base brought to light a variety of government reports, theses, and journal articles exploring the subject of training and education in the United States Armed Forces. The paucity of specific references to constructivism coupled with the continual espousal of behaviorist theories leads one to believe that this project may truly be without precedent. Ample documentation of the military's struggle to keep curriculum current and leverage the power the World Wide Web was found (Hirai & Summers, 2005; Mendoza, 2005; Morrow, 2003; Steele & Walters, 2001; Swain, 2005). Outside the military, volumes of literature have been penned on the WebQuest since Dodge's original 1995 treatise, and his Web site at San Diego State University averages more than 1,000,000 hits annually (March, 2003). Research demonstrating the power of the WebQuest in various settings was explored as well as the tool's ability to minimize surfing and maximize

learners' synthesis of their own understanding. To marry the WebQuest to the conventions of military instruction a review of the literature underlying the Systems Approach to Training (SAT) was conducted.

The Status of Military Instruction and the Need for Constructivism

The Instructional Systems Design and Development (ISDD) system milled and polished by the United States Military was the gold standard thirty years ago. Born of the Cold War and successful in the industrial age, the system has not kept pace with changes in technology or educational philosophy and may be inappropriate in the information age (Swain, 2005).

Foundations in Behaviorism

Training Doctrine in the United States Military is firmly rooted in behaviorist principles of Instructional System Development (ISD). Their definition of ISD states, in part, "(ISD) includes a subsequent specification of performance requirements in terms of behavior objectives" (U. S. Department of Defense (DoD), 2001a, p.63). The same series of military handbooks also codifies the military's instructor-centered pedagogy: "Instruction transfers knowledge and skills to the

students" (DoD, 2001a, p.60). Termed traditional instruction by Gohagen (1999), many teachers were trained in this pedagogy and it is in wide use today. This philosophy is based on the idea that knowledge exists outside the student and that knowledge becomes known to the student through instruction (Gohagen, 1999). This philosophy is embodied in decades of lock-step military instruction that has churned out "highly competent, behaviorally trained soldiers" (Swain, 2005, p.23).

Opportunities for Applying Constructivism

Writing in 1993, King coined the phrase "sage on stage" to describe traditional instructor-centered instruction. In her article she contrasted "sage on stage" to "guide on the side." "Guide on the side" describes the instructor's role in student-centered teaching. Constructivist teaching pedagogy is a formal way of describing both student-centered teaching and "guide on the side" (Gohagen, 1999).

The search for explicit references to constructivism in the literature regarding training and education in the United States Military netted few results and generally addressed emerging efforts in the realm of Distance Learning (DL) or Advanced Distributed Learning (ADL)

(Fletcher, 2005; Main, 1998). Discussion of resident training and Professional Military Education (PME) contained references to student-centered teaching or proxy terms such as "soldier-centered." Among the most striking occurrence of this was an article penned by retired Army Major General Robert Scales who writes, "Military learning must shift from an institutional to a Soldier-based system" (2006, p.38). The thrust of Scales' argument is that an overstretched military may be too busy to learn at a time when the need for learning has never been greater. His article is peppered with constructivist jargon such as "gain a deeper understanding" (2006, p.42). This type of learning objective is taboo within established military training doctrine. In fact, the verb "understand" is specifically cited as a poor choice in the guidelines for developing learning objectives (U. S. Department of Defense (DoD), 2001b).

Another theme in the literature that supports the idea that the winds of constructivism may be blowing through the Pentagon is in regard to training versus education. In framing the Department of Defense's vision for Advanced Distributed Learning (ADL), Fletcher defines

training as a means to an end for acquiring job skills, while education is an end in and of itself that prepares one for life (2005). Scales (2006) asserts that the importance of education is that it prepares the soldier to deal with uncertainty. Scales (2006) discusses some of the traits that may be cultivated by constructivism rather than behaviorism, namely that the educated soldier demonstrates resourcefulness, initiative, creativity, and inventiveness.

Latency in Military Training

A critical shortfall in the Instructional System Development/Systems Approach to Training (ISD/SAT) is the length of time that passes between the identification of training need and the implementation of a training solution. In 2002, the US Army Audit Agency reported that the average development time to produce 40 hours of instruction is 24-30 months (Morrow, 2003). Hirai and Summers (2005) hold that the status quo may have been acceptable during the Cold War but believe that a suitably agile process should take 6-12 months. They call for an overhaul of the SAT process to meet the requirements of the Contemporary Operating Environment (COE). One example of urgent training resulting from the

COE was the need to prepare service members to employ counter-improvised explosive device equipment. The US Army Engineer School set aside the SAT process and produced the training in 30 days. Their estimate for creating the same training within the confines of the SAT process: 18 months (Swain, 2005). In urging the Army to consider alternate ISD models, Swain laments the bureaucracy that is the SAT process: "cumbersome, highly detailed, and rule intensive" (Swain, 2005, p.6). The validity of the SAT process itself is not universally challenged (Swain, 2005; Steele & Walters, 2001). Swain's research included surveys of US Army Civil Service employees working in the military training arena and concluded that while only 12% indicated that the process was too slow to keep pace with changes in technology, many reported that the process needed to be abbreviated or accelerated (44% and 65% respectively) (2005). Research by Steele and Walters in 2001 found that the Army's SAT process is fundamentally sound but that it is poorly executed. They too, however, lament the slow rate of design and development of instructional materials. They hold that of 273 Soldier Training Publications, more than 200 are more than five years old and there are ten

that are actually more than 15 years old (Steele and Walters, 2001).

WebQuests

If the SAT process was executed in a timely and thorough manner the output would still be traditional instruction. MacGregor and Lou (2004) described traditional instruction as what occurs when students look to the teacher for what to learn, how to learn it, and a measure of how well it was learned. A principle purpose of this investigation is to examine the WebQuest as an alternative to traditional instruction.

WebQuests Through the Years

The WebQuest was created by San Diego State University's Dr. Bernie Dodge and was first published in *The Distance Educator* in 1995. Dodge originally defined the WebQuest as, "…an inquiry-oriented activity in which some or all of the information that learners interact with comes from resources on the Internet, optionally supplemented with videoconferencing" (1995). Frequently, the definition is truncated to exclude the part about conferencing (Gohagen, 1999; Hassanien, 2006; March, 2003; Zheng, Stucky, McAlack, Menchana,& Stoddart, 2005).

The definition has also matured over the years. In 2001, Dodge penned a follow-up to his original article where he offered the FOCUS model of WebQuest design. FOCUS stands for: Find great sites, Orchestrate learners and resources, Challenge your learners to think, Use the medium, and Scaffold high expectations (Dodge, 2001a). In that article he highlighted some of the features that make a WebQuest a valuable tool such as enabling learners to use information rather than search for it, and moving the learner up the levels of Bloom's taxonomy of educational objectives to analysis, synthesis, and evaluation (Dodge, 2001a).

Dodge's colleague Tom March pushed the definition further in a 2003 article. March insists that a real WebQuest must be grounded in constructivist principles. He rejects WebQuests that meet the letter of Dodge's 1995 and 2001 definitions but do not require new information to undergo an important transformation within the learners themselves (March, 2003). Interestingly, March is also responsible for the most vague and overly simplistic definition saying that a WebQuest is a noun referring to "a specific kind of Web-based learning activity" (2000b, Defining WebQuests).

While a consistent operational definition of the WebQuest may not be available, there is widespread agreement about the tool's features.

Features of the WebQuest

One of the key features of the WebQuest is that it leverages the power of the World Wide Web. In 1999, Gohagen described the nature of information on the Web as rich, varied, and changing. However, "rich, varied, and changing" does not necessarily equate to accurate, valuable, and current as the Web offers both information and misinformation (Vidoni & Maddux, 2002). MacGregor and Lou (2004) caution that although most students are Web savvy enough to surf the Internet they may lack the information literacy and self-regulation to efficiently and effectively move through the volume of information available. The WebQuest addresses this problem directly.

As stated in Dodge's 2001 definition, the WebQuest is intended to focus learners on using information rather than searching for it (2001a). Vidoni and Maddux (2002) place particular emphasis on this feature as they insist that computers contribute to important educational goals rather than trivial ones. They point to the WebQuest's

narrowing of the students' Web activities as a strength (Vidoni & Maddux, 2002).

The narrowing of students' efforts alludes to a related element that Molebash explained in a 2003 article with Dodge. This article talks about the Web in terms of both width and depth. The width of the World Wide Web is revealed in the results returned by search engines such as Google, which scans more than three billion pages. This is contrasted against the depth of the Web, or deep-web where students on WebQuests interact with primary sources, quantitative data, and virtual artifacts (Molebash & Dodge, 2003). The WebQuest is about more than just the Web, it is about teaching. The pedagogy of the WebQuest warrants discussion.

Pedagogy of WebQuests

The literature on WebQuests is replete with constructivist buzz words. Crocco and Cramer (2005) caution that teachers tend to label everything that is student-centered as constructivist but there are many articles that offer a more in-depth analysis. Molebash and Dodge's 2003 offering, for example, opens with an explanation of inquiry that discusses questioning, discovering, and understanding.

Scaffolding is another recommended feature that reinforces the WebQuest as a constructivist tool (March, 2003). Scaffolding is a mechanism that enables students to act more skilled than they are (Dodge, 2001a). In his 2001 article, "FOCUS: five rules for writing a great webquest," As mentioned earlier, Dodge's "S" stands for "Scaffold high expectations." A more pessimistic rationale for the necessity of the scaffold in a WebQuest is offered by MacGregor and Lou (2004). They propose that the scaffold is a crutch for students who are overly dependent on traditional instructional techniques.

Not to be outdone by Dodge's "FOCUS," Tom March offered what he terms the "3 r's of webquests" (2000a). Real, rich, and relevant are March's prescription for an instructionally sound WebQuest. He insists that a true WebQuest is real in the sense that topics are treated in such a way that the outcome is not preordained by contrived tasks or a set of resources that only show one side of an issue. The term "real" also calls back to the often overlooked part of Dodge's 1995 definition: teleconferencing. March says that real means real-world feedback, via any media, from someone outside the classroom and closer to the issue (March, 2000a). A rich

WebQuest provides learners more than a set of Web-based instructions or the bland treatment offered by textbooks and encyclopedias. It sends them on a thorough investigation exposing them to the kinds of primary resources used by those who write the textbooks (March, 2000a). March's third "R" is relevant, and while the original "3 R's" article lacks any reference or citation, his 2003 work, "The learning power of webquests" includes a well-deserved tip of the hat to John Keller, for offering the ARCS (Attention, Relevance, Confidence, and Satisfaction) model. A relevant WebQuest is aligned to the needs, interests, and motives of the learner (March, 2000a; March, 2003; Keller, 1983).

Any learning activity that can live up to March's vision of the WebQuest is also likely to live up to General Scales' vision of soldier-centered learning. March laments that too few WebQuests live up to his definition so it seems prudent to assess the effectiveness of practical WebQuests.

The Effectiveness of WebQuests

Articles touting the effectiveness of WebQuests go all the way back to Bernie Dodge's original 1995 work where he stated the success of what he simply called

WebQuest I and WebQuest II. These first two WebQuests were developed by Dodge's college students for their high-school students. In fact, much of what has been published about WebQuests and the preponderance of WebQuests themselves are for the kindergarten through grade twelve (K-12) arena.

In the area of K-12 research regarding WebQuests, knowing how the tool is perceived by students and teachers is helpful for this particular investigation. Research, such as that conducted by George Lipscomb (2003), suggests that K-12 teachers can use WebQuests to meet state standards in a way that the students feel is engaging and satisfying. Lipscomb's success in meeting social science state standards as well as providing students with what they perceive as a beneficial learning experience is paralleled by the work of Owen Donovan (2005) in the field of health education. Quantitative research by Gaskill, McNulty, and Brooks (2006) was less encouraging. They offered traditional instruction to a control group and WebQuests to a treatment group for both science and social studies lessons. They found that in social studies the WebQuest learners' performance matched that of the control group but in science the WebQuest

group lagged behind their traditional instruction peers (Gaskill, McNulty, and Brooks, 2006). Although this study was very limited and may not generalize to WebQuest users at large, it suggests that perhaps WebQuests are better suited to situations where traditional instruction has been found to be ineffective.

Obviously, teachers taking the time to author and implement WebQuests probably have a positive perception of the tool's efficacy. Perkins and McKnight (2005) investigated the perception of WebQuests by teachers-at-large by administering a "stages of concern" questionnaire (SoCQ) at a K-12 instructional technology conference. They found that teachers who had used WebQuests had a positive experience with them and teachers who were aware of WebQuests, but had not used them were interested in learning about them. The authors of this study may have erred by generalizing their results from a sample of participants at an instructional technology conference to the entire population of teachers. Teachers not sampled because they did not attend the conference and teachers who attended the conference but chose not to participate in the SoCQ may have held statistically significant views of WebQuests

and this may have introduced a non-response bias to their findings.

What can be learned from K-12 research into WebQuests may not generalize to post-secondary settings. Dodge's WebQuest page at San Diego State University has been criticized as recently as 2005 for catering only to the K-12 community (Sandars, 2005). Nevertheless, there is a considerable amount of research published on WebQuests used in a wide variety of fields. These diverse fields include: social work, occupational therapy, marketing, primary health care, tourism, and hospitality. John Sandars' 2005 article regarding the use of WebQuests as a component of workplace learning typifies this group of research and, in many ways, parallels the current investigation.

Sandars (2005) observes that the identification of training needs, and often Web-based resources that can be used to address them, can come from the team members themselves. Educational standards and codes of professional competencies can drive the efforts of learning institutions and pre-service training efforts, but WebQuests can also be developed to target an immediate training need at a specific job locale.

Sandars (2005) also brings up the issue of information literacy among those participating in WebQuests. He uses the term "Internet search and appraisal skills" and advises that users can get Web-based help in assessing the credibility, accuracy, and reasonableness of sites. While the specific tools suggested by Sandars may be inappropriate for use in this project because Americans may find British spelling, grammar, and usage distracting, the topic itself certainly has implications for the analysis phase of this project.

In the United Kingdom, a more general study of WebQuest perception was conducted by Ahmed Hassanien (2006). He conducted surveys and focus groups among travel, hospitality, and leisure students who had all completed the same WebQuest as part of one of their classes. His group of undergraduate students reported their perceptions regarding the ease of use, adequacy, and level of engagement while performing the WebQuest. His findings included several nuisance problems with the implementation of the WebQuest such as, not enough time, bad links, and slow Internet connectivity (Hassanien, 2006). Overall, his findings extended what is known

about the effectiveness of WebQuests in the K-12 arena to the adult learning arena.

Vidoni and Maddux's (2002) work regarding WebQuests and their ability to develop critical thinking skills highlights more than just nuisance problems with WebQuests. Writing in 2002, they expressed concern that WebQuests were a fad and the rush to put WebQuests into use caused many poor WebQuests to be used. They cautioned that effort should be devoted to developing criteria for excellent WebQuests (Vidoni and Maddux, 2002). Their concerns in this vein may have been largely answered by March's 2003 article, "The learning power of webquests" and the subsequent development of rubrics for assessing WebQuests such as those found on both March's and Dodge's Websites (Dodge, 2001b; March, 2002). Vidoni and Maddux (2002) also found that many WebQuests were not written in a way that matched their intended audience and often were not aligned to grade appropriate curricula. They see the discrepancy between writing and audience as a sin against developmental psychology. They suspect that failure to align WebQuest subject matter to curriculum goals is the manifestation of the attitude that it is the journey students take on the WebQuest that has value

rather than the subject they learn while taking the journey. They reject this notion due to research findings that suggest problem-solving skills are domain specific (Vidoni and Maddux, 2002). Their final concern regarding the efficacy of WebQuests is that they frequently force individuals to work as part of a team in the name of critical thinking skills and consensus building. Their concern is that the forced team effort may, on occasion, stifle the efforts of individual contributors (Vidoni and Maddux 2002). Despite this handful of misgivings, Vidoni and Maddux (2002) confirm the power of WebQuests in general and believe they may help students develop critical thinking skills.

Again, it would seem that developing critical thinking skills is closely aligned to the goals of military leaders in the 21st Century. Surely, critical thinking cannot be taught effectively through drill and repetition.

Instructional Systems Development

This chapter opened with the observation that the military's brand of Instructional Systems Design (ISD), the Systems Approach to Training (SAT), is too slow and

too deeply rooted in behaviorism to meet the needs of a thinking force and an ever-changing landscape. Nevertheless, an instructional design project must follow and instructional design process and literature regarding ISD models was explored in order to select a viable process. Since a goal of this project was to inject constructivism into military training, a constructivist ISD model was examined.

Constructivist Instructional Design

Published in 1995 and revised in 2000, the Reflective, Recursive Design and Development (R2D2) model has been championed by Jerry Willis. Willis' model is based on examples and lessons learned from software development models. Some of the parallels between the instructional design and software design models include spiral development, prototype testing schemes, and a user-focus. The key difference between this constructivist model and traditional "analyze, design, develop, implement, evaluate" (ADDIE) models is that the R2D2 is deliberately non-linear (Willis & Wright, 2000). The R2D2 model is constructivist in and of itself; its use does not necessarily result in instructional products or content that leverages the benefits of constructivism.

Can a classic ISD model such as the Dick & Carey model be used to create constructivist instructional products? M. David Merrill believes that this is the case and offers First Principles of Instruction. His approach offers a set of common instructional principles that, when used, will result in effective teaching regardless of which instructional theory is subscribed to, or which ISD model is followed (Merrill, 2002). The first principles of instruction are: problem, activation, demonstration, application, and integration. In Merrill's article he draws from the established experts of both the positivist and relativist epistemologies. Gagne's inspiration is present in Merrill's description of activation, and Jonassen's influence is seen in the descriptions of problem and articulation (2001).

If, as Merrill suggests, adhering to the first principles of instruction is the keystone element of good instructional design, then perhaps the tried-and-true ADDIE models are preferable.

Analyze, Design, Develop, Implement, Evaluate

The Marine Corps' flavor of the ADDIE model is the Systems Approach to Training (SAT). In fact, the opening five chapters of the SAT Manual are titled: Analyze,

Design, Develop, Implement, and Evaluate (Marine Corps Combat Development Command (MCCDC), 2004). In addition to its iron-clad relationship with behaviorism that was noted previously, the SAT process is also molded to fit the massive bureaucracy of the Marine Corps Combat Development Command. In 2005 Swain decried the bureaucracy of the Army's version of SAT as, "cumbersome, highly detailed, and rule intensive." (Swain, 2005, p.6) His observation seems generous compared to what Donald Tosti told *Training Magazine* in 2002 when he called the military's process "ISD for Dummies." (Zemke and Rossett, 2002, p.32) Tosti's comments came in the context of a vigorous debate regarding the efficacy and relevance of ISD. Two schools of thought were explored in the article in which Tosti's comments appeared. One side argued that the ISD process itself is flawed while the other claimed the fault was found in the implementation of the ISD process. In this article authors Zemke and Rossett (2002) present the views of nearly a dozen ISD experts from industry and academia. They balance the case of those who would implement ISD as an algorithm against that of those who view it as a heuristic. While this article was presented as a synthesis of expert opinion, Visscher-

Voerman and Gustafson (2004) leveraged the experience of expert ISD practitioners in a research study.

In their study, Visscher-Voerman and Gustafson (2004) examined the activities of select experts as they went about actual development projects in a variety of domains. They sought to identify how the elements of the ADDIE process were carried out in terms of: inclusion, omission, sequence, time, and emphasis. Their analysis in this opening phase of their research revealed that while commonalities were found among the group, no clear patterns emerged in the specific ADDIE elements they were looking for. Further investigation in the same study revealed that the various research subjects could be grouped by theoretical framework. They found three different paradigms represented in the data from their study and they deduced a fourth. Their paradigms are labeled: instrumental, communicative, pragmatic, and artistic. As an example, they offered that developers in the instrumental paradigm were more likely to subscribe to the more prescriptive design models such as the Dick and Carey model while their peers in the pragmatic school were more prone to models that emphasize cycles of

testing and revision such as rapid prototyping (Visscher-Voerman & Gustafson, 2004).

This research by Visscher-Voerman and Gustafson and the article by Zemke and Rossett are based on the practices of experts from the field of ISD. Perhaps the more prescriptive ISD models should be viewed as scaffolds that enable those developers who have not yet attained expertise to produce sound products. Adopting the heuristic view of the ADDIE process enables a thorough demonstration of the participant's learning, and it is well aligned to the content of the Instructional Technology Master's program and the prescribed Master's project format.

Summary

This review of the literature demonstrates that this is an original product, which has the potential to unlock the benefits of relativism in what has traditionally been a positivist environment. Moreover, it highlights a potential niche for the WebQuest to fill by providing training solutions that are valid, timely, and effective.

CHAPTER THREE

PROJECT DESIGN PROCESSES

Introduction

The end-state of this project is for enlisted members of the United States Marine Corps to benefit from the learning opportunities provided by WebQuests. The author's vision is that the WebQuests used will be developed and implemented by the noncommissioned officers who are the immediate supervisors of those marines carrying out the WebQuests.

Analysis

The analysis phase of this project sought to gain a thorough understanding of the problem, the learners, and the content. A way to measure the success of the project was also identified. The first step in the analysis was to clearly identify the problem to be addressed by this project.

The Problem

Military training has many strengths. The Marine Corps, for example, provides basic military training and occupational specialty training for more than 35,000 new recruits each year. The Corps' ability to provide

quality training for so many personnel in formal schooling is a testament to the effectiveness and efficiency of the Systems Approach to Training. The Corps' success in training extends beyond formal training settings to operational units of the Fleet Marine Force where unit-level training and managed on-the-job training prepares individuals and teams for the challenges of the battlefield. Tasks that must be performed by specific personnel, in a specific manner, and to a specific standard lend themselves to the prescriptive application of ISD and have been the core of military training for decades. This most-of-the-people most-of-the-time method works well for operating and maintaining the machinery of the Nation's defense. The obvious flaw here is that most-of-the-people, most-of-the-time is often too low a standard. Moreover, the contemporary operating environment has raised the level of performance required by individuals at every level. In the words of the General Michael Hagee, 33rd Commandant of the Marine Corps, the so-called strategic NCO "has to have the technology and the education to make those critical decisions that he is going to have to make on the battlefield" (Hagee cited in Miles, 2005 p.1).

This disparity between the expectation and the current training - between theory and practice - can be illustrated in the Corps' policy and training regarding sexual harassment prevention. The goal of the Marine Corps' policy on sexual harassment holds that, "All Marine Corps personnel will treat each other with dignity and respect and will maintain a professional work environment free from sexual harassment" (Headquarters Marine Corps, (HQMC), 2006, p.1). The applicable training standard that mandates initial training and annual refresher training on this topic requires marines to, "Describe the Marine Corps policy on sexual harassment" (Department of the Navy (DON), 2007, 4-p.9). The gap here is that the individual marine's ability to describe the policy does not guarantee that he or she can contribute to a harassment-free workplace. This dilemma is codified by the SAT process because it mandates that learning outcomes be stated as observable behaviors, in this case "describe," when the actual goals of the policy are constructs: dignity and respect. As constructs, dignity and respect fall into the affective domain but the learning outcome mandated by the SAT process is a behavior.

Many of the training needs that might be addressed alternatively, and more effectively, in WebQuests fall into the affective domain. Equality, safety, substance abuse, and domestic violence are just a handful of the high profile training needs that can't be addressed by drilling marines on the policies. The Marine Corps' traditional approach to resolving this disparity has been to increase enforcement and consequences or to adopt a zero tolerance policy. Clearly, implementing effective training before the fact is preferable to these big-stick tactics.

The potential application of WebQuests in the military extends beyond the affective domain. The ability of individuals and groups to access primary resources in near-real time via the World Wide Web opens up opportunities in the cognitive domain that may not have existed before. As detailed above in the review of the literature, there is often a significant time-lapse between the identification of a training need and the implementation of an appropriate training solution. More often than not, the training solution that is created is the result of analysis and synthesis by subject matter experts and training specialists. Seldom do the

solutions offer learners opportunities to analyze, evaluate, and create. This key feature of the WebQuest offers the greatest potential for applying Webquests in the military.

The Learners

As revealed in the review of the literature, WebQuests have been well received by learners at all levels, and the tool has been lauded by educators and researchers alike. It should be no surprise that learners of the millennial generation, or "millennials," are enthusiastic and capable when it comes to leveraging technology in their learning. Meta-analysis by the United States Department of Education published in the *National Education Technology Plan* characterized millennials in this way: "Today's students are very technology-savvy, feel strongly about the positive value of technology and rely upon technology as an essential and preferred component of every aspect of their lives." (U. S. Department of Education (DOEd), 2004, p.19).

It is then necessary to determine if the marines targeted in this project are millenials. The active duty component of the Marine Corps' enlisted force is young and in a perpetual state of turn-over. To maintain the

strength of the active duty enlisted force, the Marine Corps recruited and trained 35,602 marines in 2007 (Headquarters Marine Corps (HQMC), 2008b). In the same year, the total active duty enlisted strength of the Marine Corps was 166,781; therefore 21.34% of the force left active duty and was replaced by new recruits (HQMC, 2008b). The Defense Manpower Data Center (2005) reports that 99.9% of enlisted marines have graduated from high school and since 45.42% (75,756) of the active force serves in the bottom three enlisted ranks, it can be concluded that the vast majority of marines targeted to perform WebQuests will have graduated from high school in the last three years. Due to the high turn-over rate and aggressive promotion tempo the marine noncommissioned officers who would be targeted to author and implement WebQuests will have graduated from high-school in the last three to five years (Headquarters Marine Corps, 2007). For these reasons, it can be concluded that the marines targeted in this project can be described as millenials.

To determine if what has been written about WebQuests and the members of the millennial generation can be applied to those young Americans choosing to

enlist in the Marine Corps a survey was prepared and given to 70 participants at the Marine Corps Communication Electronics School in Twentynine Palms, California. Survey respondents were recent graduates of recruit training who were assigned to follow-on training in the tactical communications and electronics maintenance training companies. Only seven participants were age 27 or older and may not be properly described as millenials. Complete survey results are reported in Appendix (B). With regard to technology in general, 65 respondents agreed or strongly agreed that access to technology was important to them, and 50 respondents described themselves as skilled technology users. The number of marines who were familiar with the WebQuest was smaller, but still significant. Twenty-six of 70 marines reported experience with, or familiarity with, WebQuests and four marines stated that they had created WebQuests. This sub-group of 26 marines was split on the question of whether WebQuests are a good alternative to direct instruction, but not one disagreed with the statement that WebQuests are an effective tool for learning.

This investigation of labeling the learners not only informed the design process, but it also raised questions about what should be presented to the learners.

The Content

Obviously, the product developed for this project had to present a core body of knowledge regarding WebQuests. Much of this content was sourced from articles cited in the literature review. (E.g. Dodge, 2001a; Molebash and Dodge, 2003; and March, 2000b.) This core body of knowledge was also supplemented through document recovery from several strong Web sites such as those published by Bernie Dodge, Tom March, and Thirteen Ed (Dodge, 2001b; March, 2002; and Thirteen Ed Online, 2004).

The WebQuest core had two main sections and made up the bulk of what was presented to the students. The first main section of the WebQuest core took the learners on a guided tour of the WebQuest from introduction to conclusion. The five main elements of the WebQuest - introduction, task, process, evaluation, and conclusion - were presented sequentially with the function and structure of each complemented by analogy and example.

Analogies were used to draw parallels between the WebQuest elements and military training events. For example, evaluation rubrics were compared to the scoring tables of the Marine Corps Physical Fitness test. Examples of WebQuest elements were drawn from various WebQuest repositories and chosen based on three criteria. First, they had to be superior examples of the WebQuest element they were selected to represent. Second, they had to be intended for an age group roughly the same as that of new Marines. Finally, they had to specify that they were subject to a creative commons share-alike license. Lynne Bailey's (2006) WebQuest "Credit Cards" was found using the search utility at WebQuest.org, it contained concise introduction and conclusion sections that closely paralleled the concepts as they were portrayed in the literature, it was intended for high-school seniors or college freshmen, and it specified a creative commons license.

The WebQuest components were all revisited and expanded on in the next main section of the WebQuest core: the development process. In the WebQuest development process, learners were offered a highly scaffolded variation of the WebQuest development process

offered at WebQuest.org. This process, in its original form, may have been useful for professional educators but the audience for this project needed a great deal of support to enable them to create WebQuests. Scaffolding served two purposes in this project. First, it enabled novices to deal with the practicalities of authoring WebQuests. Second, it was aimed at boosting the quality of WebQuests created by the Marines.

One key scaffold in the expanded development process was to break up the process into smaller, more manageable chunks. This took the form of fashioning the revised process after the Marine Corps Planning Process (MCPP). The MCPP is a sequential process with well defined steps, or blocks. Each block has defined outputs that serve as the inputs to the following block. Applying this scaffold turned the process into an algorithm that a novice could follow to create a complete and workable WebQuest.

Scaffolds directed toward making quality WebQuests included additional examples of proven WebQuests and job aids. Job aids included sample tasks for marine-specific WebQuests, forms, and templates as well as offering best practices such as writing the introduction and conclusion

after the bulk of the WebQuest was formed. On the whole, the presentation of the WebQuest was directed toward enabling learners to make effective WebQuests. With the WebQuest itself at the core of the project there were still superordinate issues that needed to be addressed.

The WebQuest is a form of inquiry-based learning. Inquiry-based learning is, in turn, rooted in constructivism. This content had to be discussed in the product in order to place the WebQuest in context with other forms of instruction that marines were likely to be more familiar with. Moreover, this knowledge equipped the learner to know if a WebQuest was an appropriate choice for a specific training need. Since the WebQuest is not a panacea for all shortfalls in human performance, users of this project are faced first with the decision to either use, or not use, a WebQuest.

To aid them in making the choice, a taxonomy of learning was presented. This was necessary because even though there are existing instructional products that cover this material, such as the Formal School Instructors Course and Marine Corps Institute's distance learning course, *Principles of Instruction for the marine*

NCO, analysis revealed that none of the participants in this project had completed either course.

In addition to these superordinate topics and the WebQuest core, analysis revealed a number of subordinate or peripheral content areas that were important to the course content.

One important subordinate concept that was widely addressed in the literature base was information literacy. Dodge's *Focus: Five rules for writing a great webquest* (2001b) is a particularly strong example in this vein. Finding great sites and exploring the deep-web both require competence in this area. Other elements of information literacy that are relevant to WebQuest development and implementation are copyright and fair use. Since the vast majority of survey respondents in the learner analysis described themselves as expert technology users, this topic sparked a key issue in the design phase: whether to include this information as required for all learners or to make the route through certain content optional.

Other subordinate topics that the content of the course must include were not addressed in the literature because they are specific to the military. Department of

Defense protocol mandates protection of DoD Web resources through the use of Public Key Infrastructure. Users' private keys are stored on their United States Government Identification cards, aka, common access cards (CAC). This situation mandates that learners on many military WebQuests will to have to use government furnished end-user computing equipment (EUCE) since few home personal computer users have the hardware and software needed to use their CACs at home. Conversely, information assurance policies also mandate that specific Web sites and many types of Internet activities be blocked on government networks. These include Web 2.0 technologies such as social networking (MySpace) and media sharing (YouTube), which may be useful in certain types of WebQuests. Documents recovered from the Navy Marine Corps Internet (NMCI) Web site confirmed that these types of sites, and specifically MySpace and YouTube, are blacklisted (Navy and Marine Corps Internet, 2007). This may prove problematic since survey respondents reported a high level of interest in these technologies. Depending on the type of WebQuest being undertaken, learners may be required to access the Internet from a government network or from a non-government system, but not both.

A final topic that is subordinate to the WebQuest core but was revealed to be of significant importance through analysis of the *DoD Information Security Program* (1997) is the sensitivity of military information sources. Government Web sites that contain sensitive for-official-use-only (FOUO) information are likely to be used as sources in the process section of military WebQuests. Learners undertaking these WebQuests may create derivative works that would warrant the same level of protection afforded the FOUO source. This situation is exacerbated by the possibility that when learners lend their own creativity and experiences to the output product, they may create products that meet the FOUO criteria, even if all the Internet resources accessed were benign or approved for public release. Those creating WebQuests and supervising their implementation will have to be armed with the ability to identify and protect sensitive government information.

Learning Outcomes

For this project two broad learning outcomes were identified: At the conclusion of this training users will be able create and implement WebQuests. Through task analysis, these broad learning outcomes inspired

more specific outcomes that informed the various sections of the product. As an example, the broad task "create WebQuests" inspired specific tasks such as "evaluate Web resources" and "develop evaluation rubrics." Specific tasks beneath "implement WebQuests" included such items as "observe copyright protection" and "protect government information." Table 1 lists the core learning outcomes and a complete list of learning outcomes is provided in Appendix (C). The vast majority of these tasks can be linked back to elements of the analysis and those that cannot were born out of the input offered by testers during formative evaluation.

Table 1. Sequenced List of Core Learning Outcomes

Learning Outcome	Terminal or Enabling
1. Define inquiry-oriented learning	Enabling
2. Compare WebQuests to traditional instruction	Enabling

3.	Create WebQuests	Terminal
4.	Classify the learning domain of an example	Enabling
5.	Given a scenario classify it as a good or poor choice for WebQuest development	Enabling
6.	Document a Web Search	Enabling
7.	List the five major components of a WebQuest	Enabling
8.	Match a WebQuest component to its description	Enabling
9.	Match a WebQuest component to the parallel component in a standard USMC lesson	Enabling
10.	Record WebQuest topic ideas	Enabling
11.	Write a WebQuest Task	Enabling
12.	Write a WebQuest Process	Enabling
13.	Create a WebQuest Evaluation Rubric	Enabling
14.	Write a WebQuest Introduction	Enabling

15.	Write a WebQuest Conclusion	Enabling
16.	Implement WebQuests	Terminal
17.	Identify Web Site access constraints	Enabling
18.	Plan WebQuest instruction	Enabling

The next step in the development of learning outcomes was to group and sequence the data into a logical order of manageable chunks. Then each chunk was reexamined through the lens of the learner analysis. It was necessary to decide which material should be emphasized and covered fully because it is integral to the WebQuest project, and which material should be marginalized or addressed via job aids or other courses. These choices were, in part, based on the assumption that marines who need support on those areas not fully covered will take advantage of other resources if they are offered to them.

Measuring Success

The combination of asynchronous implementation and the constraints of time made measuring the success of

this project a challenge. Ideally, a project such as this would have resulted in the creation and implementation of WebQuests by marines taking the course. Pre- and post-testing or comparison of a treatment group to a control group would provide a valid source of measurement. These processes, of course, would also have implications for the general effectiveness of WebQuests, not just those created and used by marines. As detailed in the limitations section, a measurement scheme that fit the constraints of the project was needed. As a compromise, marines completing the course were asked to complete end-of-course critiques that included predictive survey questions about their confidence in their mastery of the learning outcomes, confidence in their ability to create WebQuests, and the likelihood that they would create and implement WebQuests for their future training needs. The results of these measurements are reported in Appendix (D) and discussed in Chapter Four.

Through document recovery, mining the literature base, and a survey of the target audience, this analysis has painted a sketch of the problem, the learners, and the content. The analysis has shown that there is a potential niche for the WebQuest to fill in military

training, and that young men and women graduating from high school and choosing to enlist in the Marine Corps are capable and enthusiastic learners who are receptive to the type of technology-based learning offered by WebQuests. The next step, the design phase, added detail and color to the sketch painted in the analysis phase.

Design

The design phase of this project sought to build on the work done in the review of the literature and the analysis. Here the researcher's assumptions and vision of the final product were articulated and the technical features of the deliverable were addressed.

Assumptions

One of the biggest assumptions impacting the design of this project is that the final project was to be implemented in an asynchronous environment. What the marines would call "fire-and-forget," learners using this course do so on their own without planned instructor-student or student-student interactions. Moreover, since no formal link exists between the project and the Marine Corps there is no mechanism to record enrollments or to report grades. While this may seem to be a reckless

assumption it is not uncommon in computer-based training courses used by marines to be crafted in the fire-and-forget style, and student assessments are often limited to self-assessments in cases where no criterion has been established in the training standards.

This situation alludes to another assumption made in this project; using features found in existing products used by marines will not only speed the development of navigation and layout, it will also result in a product that marines will approach with some sense of familiarity. The audio features and the replay audio button are examples of how this assumption affected the deliverable. Assumptions also impacted how the WebQuest itself was treated.

Simply stated, the WebQuest does not have to be perfect to be effective. As a technology-based, inquiry-oriented, constructivist tool, very lofty standards have been offered by scholars such as Tom March, who holds that a true WebQuest must be real, rich, and relevant (March, 2000a). However, March himself admits that Web-based learning activities that don't meet his high standards may still be effective (March, 2003). For the purpose of this project, a successful WebQuest is one

that is equal to or better than the status quo. That is to say, a WebQuest of acceptable quality is one that achieves the same or better result than whatever a traditional military training technique would have achieved. A WebQuest that replaces a typical "death by PowerPoint" lecture may fall well short of March's vision but still be a significant improvement over the lecture.

Features

At this point in the design, enough was known about the learning outcomes and what success would look like to focus attention on some of the other features that would shape the development of the product. A pattern of spiral development was envisioned for this project. The first loop of the spiral is the subject of this project. The second loop would have the software elements of the product converted to a format compatible with the Marine Corps' learning management system and distance learning run-time environment. The Department of Defense has adopted the Sharable Content Object Reference Model (SCORM) and there are several authorware suites that support the development of SCORM-compliant content. One such product is Articulate Presenter. A key feature of Presenter is that instructional content developed using

Microsoft PowerPoint can be enhanced with flash content and converted to a Web-friendly, SCORM-compliant format. A smooth transition between the first and second spirals made PowerPoint a logical choice for developing the first spiral. Therefore this project ends upon the completion of a complete instructional design process and the delivery of an instructional project developed, principally, in PowerPoint. Obviously there are bandwidth and file-size limitations accepted with the adoption of PowerPoint. This was an acceptable compromise and was discussed in the limitations section.

Best known for its use as a presentation tool in classrooms and conference rooms, PowerPoint was versatile enough to recreate the look and feel of computer-based-training products, which most marines are likely to be familiar with. Examples of the features envisioned for use in the product included audio narration, a replay audio feature, and perhaps most importantly, simple intuitive navigation.

In addition to the functional features envisioned for this project, several tenants of design were relevant to the course content. This included both features to be excluded as well as those to be included. Chief among

the features to be included was a heavy reliance on example and analogy. This is because a feature to be excluded was links to external sources on the Web imbedded in the core of the course. The fear was that as marines went through the course they might become more interested in exploring external sites, and their attention would wander away from learning about WebQuests. As an example, the Insurance Institute for Highway Safety (IIHS) was used as a demonstration in the course. This was accomplished through the use of text, narration, and graphics rather than simply hyperlinking to the actual site. This is designed to prevent learners from visiting the IIHS Website and looking up crash test results for their cars instead of paying attention to learning about WebQuests. This topic can be grouped under the heading of "learner control over navigation" and will be revisited in the development section because the testers expressed a strong desire for more control over navigation within the core.

Although presented here as if there was a clear line between the design and development phases, there was actually significant overlap as outcomes, assumptions,

and features were impacted by the reality of creating and testing a working product.

Development

The development phase of this project included creating, testing, and revising the course material. Although presented here in a concise and linear manner, these steps actually unfolded over the course of a year and began in earnest during the author's enrollment in a class that focused on the design and development of instructional materials.

Early Prototype

The early prototype of this project contained about 20 screens of information from the beginning of the first module in the course. It included the author's choices regarding features such as the navigation controls, screen layout, and color palette. Figure 1 is a typical screen from the prototype.

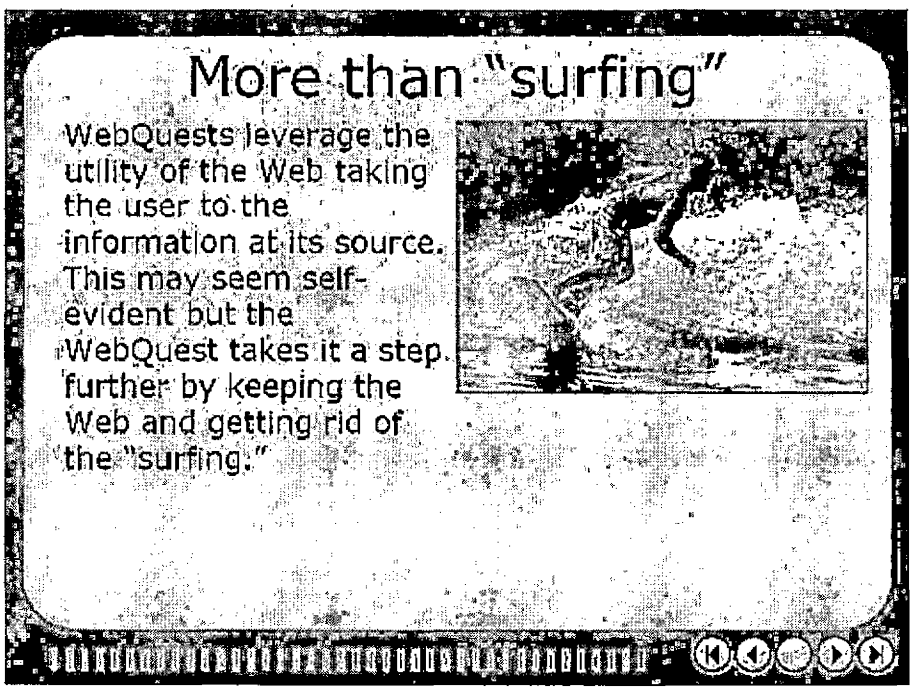


Figure 1. Screen Captured from Early Prototype.

This early stage of prototype development brought to light many of the nuisance issues such as file naming, folder management, and version control that went poorly in this phase and well in the later phases. Perhaps more importantly it resulted in an orderly process of authoring text and managing assets in a word processor before moving them into the delivery platform. This allowed a thorough and deliberate proofreading process to be conducted before affecting corrections created problems in pagination or screen-breaks.

The prototype was presented to eight testers from the target audience of marine noncommissioned officers. Of these eight, only three returned input in time to meet the deadlines of the course. These three marine sergeants took the truncated course and completed questionnaires about the course's usability and the student's interest in the subject matter. The results of this process were summarized and presented to the author's peers in the Instructional Technology Master's Program as the culminating exercise of the course. This session also included an overview of the complete product and a vision of the various paths available to students.

It was very encouraging that both groups expressed considerable interest in the subject matter, and much of the discussion focused on the topic of WebQuests rather than issues of usability and pedagogy. In the usability arena the marine testers did point out some errors in content as well as glitches in the navigation mechanisms, but they were largely satisfied with the simple navigation, and choices of color and font. One area where their input was particularly instructive was in regard to the use of language and writing style in the model. Alternating between the rigid academic style

required for graduate level coursework and the conversational style appropriate for teaching products had resulted in a somewhat disjointed presentation of text. Identifying this problem early in the process was beneficial and guided the further development of the project.

Interestingly, fellow instructional technology master's students who were predominantly K-12 teachers proposed a more stereotypic vision for the interface. For example, their suggestions included a camouflage or olive drab background. One area where the group offered particularly useful information was the creation and inclusion of audio narration of passable quality. One limitation of this model was that efforts to add audio had failed because of the difficulty associated with recording and editing quality audio. Students of instructional technology offered tips and techniques from their own experiences with podcasts and capturing audio recordings of their students. This small test produced a bounty of lessons learned that paid dividends as development continued.

Content Development

The volume of instructional content in the early prototype test turned out to be less than five percent of the final product, and the prototype was shelved for months while the literature review was penned and analysis was performed.

Development began again by expanding the instructional outcomes and sequence from the design phase into a broad outline. Instructional events, including placeholders for attention gainers, transitions, and summaries were added to the outline until a complete skeleton of the project was created. This was followed by writing out page after page of text that would either be retained as text in the final product or converted to audio. These text passages included examples and analogies to help the learners connect these new concepts to what they already knew. This process included recording notes about ideas for animation and graphic assets that might be developed or added in the next stage of development.

The transitions between each sub-step in the development phase were an ideal time to perform a sort of quality control on the process just completed. A type of

formative evaluation, these self-checks included such simple tasks as proofreading and comparing the progress against the vision and learning outcomes specified in the design phase in order to ensure agreement and maintain focus.

Recovering or creating non-audio and non-textual assets for the project was a simple but time-consuming endeavor. For example, photographs of Marines engaging in various training and real-world activities were needed as examples and analogies. Original photography for this project was ruled out due to the difficulty involved in gaining access and permission to photograph marines on the job as well as the technical difficulties associated with producing high-quality digital photographs. A better course of action was to search the archives of the various services' on-line news photographs. Each of the Nation's services creates and publishes thousands of high-quality, approved for public release, photographs on their Web sites. Since the government cannot assert a copyright on works produced at taxpayer expense, these photographs can be used without restriction; however, every effort was made to credit the photographer and provide a link to the original source. When a photograph

was needed to exemplify the naturalization level of the taxonomy of the psychomotor domain, a photograph of the Marine Corps- and Navy-sponsored Busch Series race cars was recovered from the Department of Defense Multimedia Gallery at www.defenselink.mil.

Creating animations was also relatively simple since the delivery platform chosen was PowerPoint. Since the next spiral in the development is to use Articulate Presenter to convert PowerPoint into Flash, going to the trouble to create Flash content for PowerPoint would have been inefficient. Animations were used sparingly in this project; they were reserved for only those few occasions where text, photographs, or audio alone were incapable of communicating the same message. In these cases PowerPoint animation was used.

With the bulk of the project content created and cataloged, it was time to revisit the early prototype and begin assembling the project's principle deliverable. This began by affecting some of the changes recommended during the testing of the early prototype. From there, cutting and pasting text as well as inserting graphics and pictures into PowerPoint was a long but surprisingly satisfying process. There were occasional points of

friction where additional graphics or photographs had to be created or recovered and these often slowed the process considerably. This process of assembling the deliverable also resulted in a refinement of the course text. That is, those elements that were to be inserted as audio narration were identified and segregated in the form of a script. Since the author's vision of the project included full audio narration, like that used on many of the computer-based-training products provided to marines, nearly every bit of what was pasted into the PowerPoint files was also inserted into the script. Some of the particularly long passages and some that accompany animations were reserved as audio only. Again, this section of the development concluded with a series of quality control self checks.

Creation of the audio assets presented the next challenges. The goal here was to create professional quality audio without the tools used by professionals. To this end certain best practices gleaned through participation in the Instructional Technology Master's program were implemented. One practice was to use a universal serial bus (USB) microphone in the form of Belkin's TuneTalk to capture voice recordings directly on

an Apple iPod. This combination of hardware was complemented by a sound isolation box created by lining a copier paper box with foam rubber sound-proofing material. By leaving a six-inch square hole in one end and placing the iPod in the other it was possible to isolate virtually all sound except the narrator's voice. Obviously, the narrator's voice and skill with the spoken word were key elements of creating quality audio. Luckily, a volunteer was available who had experience with voice-over work and had served in the Marines, so he was comfortable with the jargon. Despite these efforts the resulting tracks were still well short of the quality found in professionally created products.

Two recording sessions were conducted, which resulted in more than 300 takes needed to capture all the audio assets necessary for the final product. After syncing with iTunes, the audio tracks were converted from .wav to .mp3 format and edited to their final versions using Audacity. Because file naming and indexing the content pages were planned early and used consistently throughout the process, adding the audio tracks to the appropriate slides was a quick and simple process.

After another round of self-imposed quality control checks the product was packaged for compact disc and copied for delivery to the testers. This first round of complete and deliberate formative evaluation is discussed further in the evaluation section of this chapter. It suffices to say that the development phase was revisited after both rounds of deliberate formative evaluation. Just as evaluation was discussed here in the development section, periods of development will be discussed in the evaluation section.

Once these rounds of formative evaluation were completed it was time to look toward implementing the course.

Implementation

The implementation phase of this product began with an effort to recruit users from the target audience. Course materials and other pertinent information such as e-mail addresses and phone numbers were distributed to eleven marine sergeants and one marine corporal who had volunteered to serve as participants in this project. All of these marines were students in the advanced training courses at the Marine Corps Communication

Electronics School in Twentynine Palms, California. This is important to note because their current assignment as trainees may have impacted their reaction to and enthusiasm for a product that is designed for trainers.

Materials

The compact disc issued to the marines included the massive PowerPoint files that make up the core of the instruction. The PowerPoint table of contents and closing page of each segment included links to on-line content that contained wrap around materials to help the students transition their new knowledge and skills into successful WebQuests. These include sample WebQuests developed or adapted for use by marines. Job-aids including templates and sample WebQuest tasks as well as links into the extensive network of WebQuest related sites serving the civilian education and training communities. Most importantly, the materials included a link and credentials for them to access the on-line end-of-course survey.

Angst

Students were asked to e-mail or phone the researcher when they completed the training and the on-line end-of-course survey. After a week passed with no

response from any of the testers, a gentle reminder was sent to all twelve participants via instant message to their mobile phones. Over the course of the next month, seven marines responded that they had completed the training and questionnaires. The poor rate of return and the slow pace of responses were causes for significant concern. Additional follow-ups were considered and rejected because the recruitment had stressed the voluntary nature of participation. Any arm-twisting may have undermined the validity of the responses; in fact, some may have completed the survey randomly, having never taken the course. Launching another recruiting effort to increase the overall number of respondents was also considered and rejected since the first round took an investment of over six-weeks between looking for recruits and receiving the bulk of the responses. The decision was made to proceed on the basis of the seven responses received and if any additional data came in that significantly changed the findings, they would be rewritten.

The asynchronous delivery of the course resulted in the most stress, but least analysis in terms of

documenting the ADDIE process. The same could not be said of the evaluation phase.

Evaluation

There were two evaluation schemes employed in creating and implementing this project. Formative evaluation ensured that the product implemented was instructionally sound, technically operable, and free from errors in form and content. Summative evaluation examined the overall effectiveness of the course by estimating changes in behavior among those completing the course.

Formative Evaluation

In addition to the early prototype testing conducted as part of a class in the Instructional Technology Master's program and the numerous rounds of quality control checks, three rounds of formative evaluation were conducted on the course materials. This process began by recruiting testers with certain characteristics not present in the target audience to perform alpha-phase testing. The desired criteria for serving as a tester in this phase included general military experience, experience in the military training arena, and training

in an instructional design process. The five testers selected all had fifteen or more years of service in the Marine Corps and had served on the faculty at one or more Marine Corps schools or training centers. As formal school faculty, all had completed both the Formal School Instructors Course and the Curriculum Developers Course, which teach the Systems Approach to Training (SAT) process. Although not specifically stated as a criterion, it is noteworthy that all of the testers in this phase were college graduates.

Although minor corrections in content were accepted in this first round of testing, its primary goal was to evaluate the instructional validity of the course. At this point major changes in the course design would still be considered if the testers raised important issues. Some of the questions asked of these testers included whether or not the examples made sense, the concepts were explained clearly, and if the graphic organizers and other media elements were useful. By far, the audio elements of the course generated the most comments.

The five testers in this phase generated 68 content-specific comments on the forms created to capture their concerns regarding graphics, photographs, text, examples,

organizers, animations, and audio. Of these 68 comments, 31 addressed some issue related to audio. The Testers' concerns about audio are highlighted by the fact that one tester said that he turned the audio off because it distracted him from reading, so 31 is actually disproportionately low.

The number of concerns testers expressed about the audio was exacerbated by the fact that there was little congruence among the testers' responses. While one tester recommended total elimination of the audio because he found it distracting, another relied upon it so much that he was "thrown off" by those screens that contained no audio. Another tester found the less-than-professional quality of the audio problematic. One area where more than one tester expressed similar concerns was on those screens where the audio explained more than what was presented textually. This concern is really at the heart of the problem.

Since using audio to expand and clarify concepts and examples was done deliberately, learners choosing to mute the audio missed that content. Other learners using the audio took the extra audio as an error in the visual presentation. The latter of these two problems was

corrected by including an explanation of the rationale behind the extra audio in the student presentation. The greater problem of some learners not wanting the audio was also handled by explaining to the student that additional important audio is present on some screens and that a flag will appear on the replay audio button to cue them to its presence.

The last issue with the audio was the imperfections in the recording, editing, and overall quality of the audio. All of the environmental, hardware, software, and procedures were reexamined to determine if better quality audio could be obtained with the resources available. It was decided that a complete rework of the audio would not result in noticeably better results. Depending on the specific problem noted by each tester, one of three courses of action was chosen. In the case of simply incorrect audio, either a reedit of the original track was created and inserted or a new audio track was recorded. In the case of poor sound quality only, it was decided that these were within the limits of acceptable error and that the sound problems would be included as a limitation in the project. If the project generates enough interest and success to warrant completion of the

second spiral, a professional sound studio may be used to perfect the audio content. In this area the testers' input was largely accepted at face value and where possible, appropriate redevelopment efforts were undertaken. This was not the case with all of the testers' input.

One example where the tester's recommendations were considered and rejected was in the area of learner control over navigation. One of the key features of the WebQuest itself is that it seeks to limit learners' control over navigation by eliminating Web surfing and focusing attention on only those Web resources relevant to the quest. This philosophy was extended into the current project by not including hyperlinks to outside resources in the WebQuest core in order to prevent the same type of distraction. Although the testers did not comment on this feature specifically, they did express a concern that intra-course navigation was linear within each module. They recommended hyperlinked sub-menus that would allow them to skip to the various sub-sections within each module.

In this case, the recommendation of testers is the polar opposite of what is found in the literature.

Stated concisely in a research summary prepared for the Office of Naval Research by the National Center for Research on Evaluation, Standards, and Student Testing (CRESST), "As the extent of learner control increases, learning decreases except for a very small number of the most advanced expert learners (O'Neil, 2003, p.14). Advanced expert learners are those with high prior knowledge in the content area or those with high meta-cognition. It was reasonable to conclude that these high-prior knowledge and high meta-cognition learners will be in the minority of those targeted by this project. The same research endorses the scheme employed in this project: simple pacing. Simple pacing allows learner control over the speed of the presentation by advancing, pausing, and backing-up, but it does not give them control over the sequence of instruction. It should also be noted that simple pacing does not harm more advanced learners (O'Neil, 2003).

There were other occasions where the recommendations of testers were rejected. These cases related to specific graphics, photographs, or passages that were of concern to individual testers. Most of the testers' recommendations in these areas were accepted and the

individual elements were reworked. For example, a graphic of the Marine Corps Silent Drill Platoon was used in two different modules to express different ideas. A tester pointed out that using the same graphic caused him to try to link the two unrelated ideas, so one of the photographs was replaced. In another case, a tester felt that a photograph of a woman marine performing the flexed-arm-hang was a poor representation of the physical fitness test. In this instance, the photograph was retained. These decisions about what to rework and what to ignore usually came down to gauging what was a legitimate concern and what were things that the testers would have done differently if it was their project.

After the results of this phase of testing were incorporated into the product it was given back to one of the five original testers. This last round of alpha phase testing was intended to ensure that no new concerns were introduced to the project during the rework process. The tester reported no new problems found as a result of the revision. This event marked the transition from alpha to beta phase testing. At this point, significant changes to the course were ruled out and all future testing would focus on identifying errors and glitches.

Beta testing was conducted concurrently with implementation. The dozen marines recruited for the implementation phase also served as beta testers. To facilitate this process, the course materials provided to them retained the index number so they could easily reference specific slides. They were also provided the blank forms used in the alpha test phase to record any errors they found.

This process returned five forms with between one and six errors listed. Imperfect audio and graphics were the most prominent error reported, and these were largely the same issues raised by testers in the earlier phases and, as such, they had been deemed to be within the acceptable limits of error and were addressed in the project limitations. Some of the correctable errors identified included errors in layering that caused graphics and text to overlap and obscure one another.

These problems were corrected, and the index numbers removed from the presentation in order to complete the product on the compact disc included as Appendix (A).

Summative Evaluation

The summative evaluation phase of this project sought to measure overall success by gauging learners'

confidence in their mastery of the learning outcomes and by predicting the likelihood that they would create and implement WebQuests. A survey instrument was prepared for on-line delivery via freeonlinesurveys.com.

The survey content was modeled after a typical end-of-course critique used in military settings. It was adapted to match the specific learning goals specified for this project and expanded to include questions predicting to what extent they might create and implement WebQuests to meet future training needs in their unit. These two elements (create and implement) were evaluated by separate survey questions.

The twelve volunteers recruited to participate in the implementation were asked to take the survey after they completed the course. A Web address and password were provided to these marines and seven survey responses were received. The complete survey results are reported in Appendix (D).

Analysis of the survey results revealed that while marines were confident that they had met the stated learning outcomes, they were unlikely to create WebQuests from scratch. In the area of predicting their future use of WebQuests there was a clear trend. Marines were

somewhat likely to implement WebQuests created by others, less likely to adapt an existing WebQuest to meet their needs, and unlikely to create their own WebQuest from scratch. Users' confidence in the success of their learning but unwillingness to apply their learning to future situations is a significant finding and greatly shaped the conclusions and recommendations contained in Chapter Four.

Summary

In this chapter the author's vision of the problem and proposed solution were offered as the analysis and design phases of the ADDIE model. The development, implement, and evaluation sections tell the story of how the solution was formed, tested, and applied. It is a story of compromise and constraints as the realities of what could be done came into conflict with what was planned.

CHAPTER FOUR

CONCLUSIONS AND RECOMMENDATIONS

Introduction

As stated in the opening paragraphs of Chapter One, the goal of this project was for noncommissioned officers in the United States Marine Corps to create and implement WebQuests. Participants in this project reported that while they had acquired the ability to create and implement WebQuests, they were unlikely to do so in the future. These results can be viewed as mixed since the teaching component was successful, but some important part of the equation was overlooked or mishandled.

Analysis of participants' responses during the evaluation phase combined with lessons learned throughout the ADDIE process lead to certain conclusions and recommendations regarding the value and the future of this endeavor.

Conclusions

The portion of the summative evaluation instrument designed to offer a measure of participants' ability to meet the learning outcomes indicated a certain degree of success. No participant reported any level of

disagreement with statements regarding their confidence in their ability to meet the stated learning outcomes. Results in this area were not an overwhelming endorsement of the training; there were several neutral responses to these questions on the Likert scales and "strongly agree" responses were rare. Conclusions about the success of the training were reinforced by participants' responses to the question about how many WebQuest ideas they had as they progressed through the training. Five of seven chose the highest band, five or more, and the other two both chose three to four. These responses demonstrate a high level of engagement with the subject matter but they also make participants' unwillingness to create and implement their own WebQuests even more puzzling.

If participants were capable of creating WebQuests and they had topic ideas, why did they report that they were unlikely to author and implement WebQuests? Survey questions about participants' future use of WebQuest were tiered to add more depth and clarity. They were not only asked if they would create and implement WebQuests from scratch, but also if they would adapt and use existing WebQuests from other sources and if they would use off-the-shelf WebQuests from other sources. On the whole,

responses to these questions were less than favorable. There was however, a clear trend that they were more likely to implement WebQuests when there was less up-front investment on their part. That is, most respondents were more likely to use an off-the-shelf WebQuest than to build an original product of their own.

The cause of this disparity between marines' ability to create WebQuests and their willingness to do so may be found in military culture and organization. Participants' free-text comments during the summative evaluation strongly indicate that this is the case. One participant commented that his superiors were unlikely to allow him to implement WebQuests that sent marines back to their quarters to spend time on YouTube. More directly to the point, another participant wrote that he would use WebQuests if he was ordered to do so, but that was not going to happen because "higher-ups" do not know about this tool. The conclusion drawn from the data and the comments is that this project targeted the noncommissioned officers who implement policy but ignored their superiors, staff noncommissioned officers and officers, who set policy and control valuable training resources, most notably time. The long-term outlook for

this project may be bleak in the absence of interest at the command level.

Recommendations

The military has a good deal of cultural inertia. This inertia causes change to be slow and often painful. Organizational change is a science unto itself. The military is acutely aware of the need for change, but proven strategies for changing military culture are rare. Two widely used strategies in this area are described by the buzz-words "quick-win" and "buy-in." A quick-win is a successful proof-of-concept test or a successful small scale implementation that can be cited in the effort to cultivate buy-in. Buy-in is a colloquialism that describes a willingness to participate in, or champion, organizational change among those in positions of leadership and authority.

A recommendation to address the shortcoming discovered in this project is to seek the quick-win. A library of proven WebQuests that address high-priority training needs may be a way to rapidly gain a foothold in the military culture. As an example, prevention of off-duty mishaps involving private motor vehicles,

particularly motorcycles, is among the top priorities of marine leadership (Headquarters Marine Corps, 2008a). Rather than teaching marines how to create WebQuests about this topic, it may have been a better long-term strategy to offer them a selection of highly effective WebQuests on this topic that would demonstrate the efficiency and effectiveness of WebQuests.

A recommendation to complement the quick-win strategy would be to initiate a marketing plan targeted at the higher echelons of leadership. This may take the form of articles submitted to the professional journal of the Marine Corps, *The Marine Corps Gazette*. Other inlets for exposing leadership to the benefits of inquiry and WebQuests include public affairs office news coverage of Marines using WebQuests and accounts of successful WebQuest implementation reported to the Marine Corps Center for Lessons Learned.

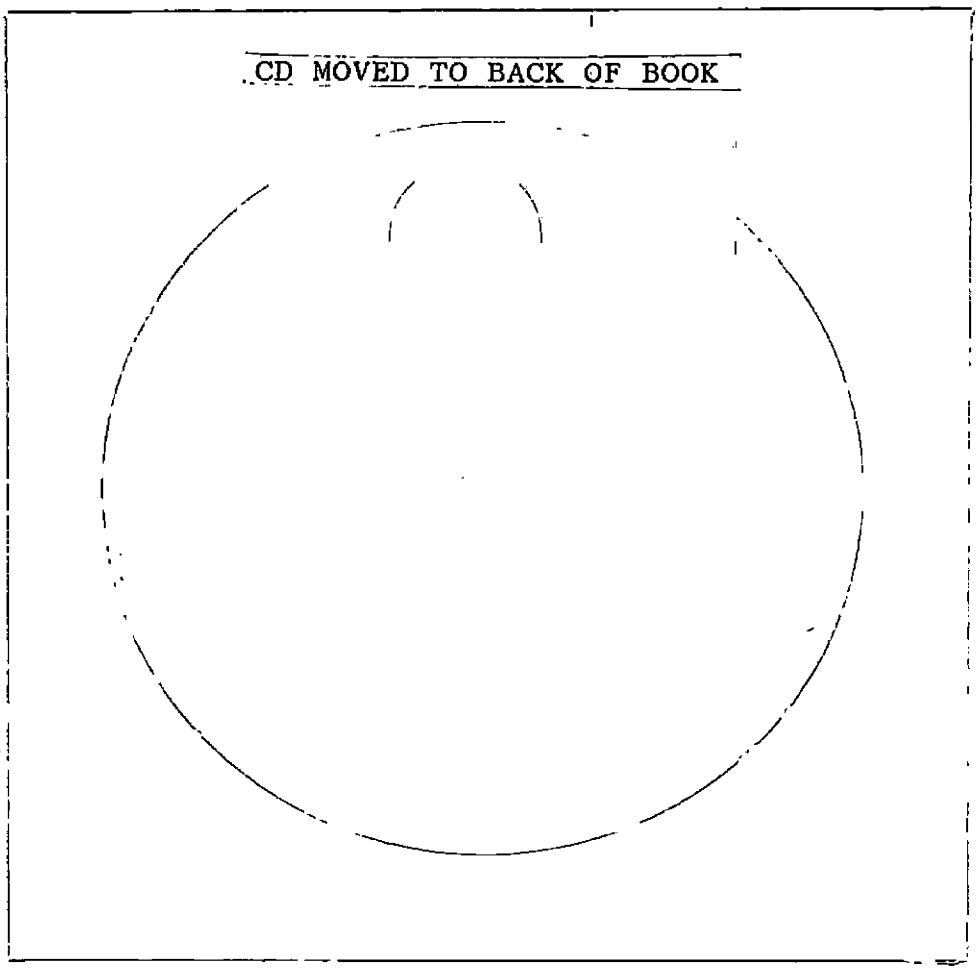
Summary

In this chapter the results of summative evaluation and lessons garnered throughout the project were used to synthesize conclusions about its success and recommendations for further study and action. As a

learning tool for providing instruction on how to create and implement WebQuests in military settings this project can be viewed as a success. The same cannot be said of the larger context of actually creating and implementing WebQuests since the project failed to address the organizational change needed for this type of tool to be embraced by decision makers at the appropriate levels within the chain of command.

APPENDIX A

CD OF PROJECT


CD MOVED TO BACK OF BOOK

APPENDIX B

LEARNER ANALYSIS SURVEY

SURVEY RESULTS OF 70 MARINES AT THE MARINE CORPS COMMUNICATION ELECTRONICS SCHOOL, TWENTYNINE PALMS, CA

1. Gender:

(68) Male
(02) Female

2. Age:
(07) >26
(00) 26
(00) 25
(03) 24
(00) 23
(02) 22
(03) 21
(11) 20
(21) 19
(22) 18
(01) <18

3. Education Level: (Chose one answer that best describes your level of civilian education.)

(00) non-HS grad
(00) HS equiv
(54) HS grad
(12) Some college
(03) 2yr degree
(01) 4yr degree or more

4. Enlistment Guarantee: (Choose one answer that best describes the provisions of your contract.)

(10) Open Contract
(01) National Call to Service
(59) MOS Guarantee MOS: _____

5. Before participating in this survey, did you know what a WebQuest was?

(20) Yes
(50) No

SURVEY RESULTS OF 70 MARINES AT THE MARINE CORPS COMMUNICATION ELECTRONICS SCHOOL, TWENTYNINE PALMS, CA

6. Have you ever performed a WebQuest?

(20) Yes
(50) No

7. Have you ever created a WebQuest?

(66) Yes
(04) No

Number of participants answering "yes" to one or more of questions 6, 7, or 8.

(26)

8. WebQuests are an effective tool for learning.

(44) n/a
(04) strongly agree
(16) agree
(06) neutral
(00) disagree
(00) strongly disagree

9. WebQuests are a good alternative to direct instruction.

(44) n/a
(02) strongly agree
(07) agree
(10) neutral
(07) disagree
(00) strongly disagree

10. Individual WebQuests are better than Group/Team WebQuests.

(44) n/a
(01) strongly agree
(06) agree
(15) neutral
(03) disagree
(01) strongly disagree

SURVEY RESULTS OF 70 MARINES AT THE MARINE CORPS COMMUNICATION ELECTRONICS SCHOOL, TWENTYNINE PALMS, CA

11. Access to technology such as cell phones, mp3 players, personal computers, and the Internet is important to me.

(46) strongly agree
(19) agree
(04) neutral
(01) disagree
(00) strongly disagree

12. Broadband Internet access is a necessity.

(22) strongly agree
(29) agree
(13) neutral
(05) disagree
(01) strongly disagree

13. I am a skilled technology user.

(23) strongly agree
(27) agree
(12) neutral
(06) disagree
(00) strongly disagree

SURVEY RESULTS OF 70 MARINES AT THE MARINE CORPS COMMUNICATION ELECTRONICS SCHOOL, TWENTYNINE PALMS, CA

	Not a User	Occasional User	Frequent User	Expert User	
13.	30	31	05	04	Blogs
14.	07	15	24	24	Social Networking: MySpace or similar.
15.	07	12	18	33	Text based chat and instant messaging.
16.	30	19	16	06	Audio or Video communication: Netmeeting, Skype, etc.
17.	21	20	17	12	Media Sharing Communities: YouTube, Flickr, Photobucket, etc.
18.	34	22	9	5	Really Simple Syndication: Usually abbreviated RSS or XML.
19.	21	20	17	12	PodCasting via iTunes or other media aggregator

APPENDIX C

LIST OF LEARNING OUTCOMES

List of Learning Outcomes			
Learning Outcome	Full	Partial	Omitted
Foundational			
Define inquiry-oriented learning	X		
Compare WebQuests to traditional instruction	X		
Differentiate between positivism and relativism		X	
State a characteristic of constructivism		X	
Create WebQuests			
Classify the learning domain of an example	X		
Given a scenario classify it a as good or poor choice for WebQuest development	X		
Search the Web effectively		X	
Document a Web Search	X		
Critically evaluate Web sites		X	
Give examples of the Deep Web		X	
List the five major components of a WebQuest	X		
Match a WebQuest component to its description.	X		
Match a WebQuest component to the parallel component in a standard USMC lesson.	X		
Record WebQuest topic ideas	X		
Write a WebQuest Task	X		
Write a WebQuest Process	X		
Create a WebQuest Evaluation Rubric	X		
Write a WebQuest Introduction	X		
Write a WebQuest Conclusion	X		
Save a document as a Web Page		X	
Create hyperlinks		X	
Cut and paste text		X	
Implement WebQuests			
Identify Web Site access constraints	X		
Plan WebQuest instruction	X		
Protect government information		X	
Observe copyright protection			X

List of Learning Outcomes			
Learning Outcome	Full	Partial	Omitted
Execute the provisions of the Privacy Act			X

APPENDIX D

SUMMATIVE EVALUATION DATA

SUMMATIVE EVALUATION DATA

1) The course length was appropriate for what was expected.

2 (28.57%) Strongly agree
3 (42.86%) Agree
2 (28.57%) Neutral
0 (0.00%) Disagree
0 (0.00%) Strongly disagree

2) The course flowed logically and was well-organized.

3 (42.86%) Strongly agree
4 (57.14%) Agree
0 (0.00%) Neutral
0 (0.00%) Disagree
0 (0.00%) Strongly Disagree

3) The course explained concepts and procedures clearly.

3 (42.86%) Strongly agree
4 (57.14%) Agree
0 (0.00%) Neutral
0 (0.00%) Disagree
0 (0.00%) Strongly Disagree

4) The course examples and analogies aided learning.

4 (57.14%) Strongly agree
3 (42.86%) Agree
0 (0.00%) Neutral
0 (0.00%) Disagree
0 (0.00%) Strongly Disagree

5) The course content was interesting and kept my attention.

2 (28.57%) Strongly agree
4 (57.14%) Agree
1 (14.29%) Neutral
0 (0.00%) Disagree
0 (0.00%) Strongly Disagree

SUMMATIVE EVALUATION DATA

6) The course was free from errors in spelling and grammar.

2 (28.57%) Strongly agree
4 (57.14%) Agree
1 (14.29%) Neutral
0 (0.00%) Disagree
0 (0.00%) Strongly Disagree

7) I had a clear understanding of what I would be required to learn or do in this course.

0 (0.00%) Strongly agree
4 (57.14%) Agree
3 (42.86%) Neutral
0 (0.00%) Disagree
0 (0.00%) Strongly Disagree

8) I am confident that I can CREATE WebQuests that will meet training needs in my unit.

1 (14.29%) Strongly agree
4 (57.14%) Agree
2 (28.57%) Neutral
0 (0.00%) Disagree
0 (0.00%) Strongly Disagree

9) I am confident that I can IMPLEMENT WebQuests to meet training needs in my unit.

2 (28.57%) Strongly agree
4 (57.14%) Agree
1 (14.29%) Neutral
0 (0.00%) Disagree
0 (0.00%) Strongly Disagree

10) Estimate the number of original WebQuest ideas that occurred to you as you completed the training.

5 (71.4%) 5 or more
2 (28.6%) 3-4
0 (0.00%) 1-2
0 (0.00%) 0

SUMMATIVE EVALUATION DATA

11) Rate how likely you are to CREATE WebQuests from scratch.

0 (0.00%) Very likely
0 (0.00%) Likely
3 (42.86%) Neutral
3 (42.86%) Unlikely
1 (14.29%) Very Unlikely

12) Rate how likely you are to ADAPT existing WebQuests created for other audiences to meet the needs of your Marines.

0 (0.00%) Very likely
2 (28.57%) Likely
3 (42.86%) Neutral
1 (14.29%) Unlikely
1 (14.29%) Very Unlikely

13) Rate how likely you are to IMPLEMENT existing WebQuests that meet the needs of your Marines.

1 (14.29%) Very likely
3 (42.86%) Likely
2 (28.57%) Neutral
1 (14.29%) Unlikely
0 (0.00%) Very Unlikely

14) Rate how likely you are to consider alternatives, including inquiry and WebQuests, to traditional military training for future training.

1 (14.29%) Very likely
3 (42.86%) Likely
3 (42.86%) Neutral
0 (0.00%) Unlikely
0 (0.00%) Very Unlikely

SUMMATIVE EVALUATION DATA

15) Please offer any additional comments or feedback that you may have.

"Higher ups don't know this stuff and won't approve it."
"Marines in the BEQ surfing Youtube is not going to be approved by the chain."(sic)
"Good Course"(sic)

APPENDIX E

INSTITUTIONAL REVIEW BOARD

APPROVAL

CALIFORNIA STATE UNIVERSITY
SAN BERNARDINO

5500 University Parkway, San Bernardino, CA 92407-2397

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Institutional Review Board
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fax: (909) 537-7028
http://irb.csusb.edu

CSUSB INSTITUTIONAL REVIEW BOARD
Exempt Review
IRB# 07016
Status
APPROVED

October 8, 2007

Mr. Brian Lafferty
c/o: Prof. Eun-Ok Baek
Department of Science, Math, and Technology
California State University
5500 University Parkway
San Bernardino, California 92407

Dear Mr. Lafferty:

Your application to use human subjects, titled, "Webquests: Improving Military Training Through Constructivism and the Web" has been reviewed and approved by the Chair of the Institutional Review Board (IRB) of California State University, San Bernardino and concurs that your application meets the requirements for exemption from IRB review Federal requirements under 45 CFR 46. As the researcher under the exempt category you do not have to follow the requirements under 45 CFR 46 which requires annual renewal and documentation of written informed consent which are not required for the exempt review category. However, exempt status still requires you to attain consent from participants before conducting your research.

Although exempt from federal regulatory requirements under 45 CFR 46, the CSUSB Federal Wide Assurance does commit all research conducted by members of CSUSB to adhere to the Belmont Commission's ethical principles of respect, beneficence and justice. You must, therefore, still assure that a process of informed consent takes place, that the benefits of doing the research outweigh the risks, that risks are minimized, and that the burden, risks, and benefits of your research have been justly distributed.

You are required to 1) notify the IRB if any substantive changes are made in your research prospectus/protocol, 2) if any adverse events/serious adverse events (AE's/SAE's) are experienced by subjects during your research, and 3) when your project has ended. Failure to notify the IRB of the above, emphasizing items 1 and 2, may result in administrative disciplinary action. You are required to keep copies of the informed consent forms and data for at least three years.

If you have any questions regarding the IRB decision, please contact Michael Gillespie, IRB Secretary. Mr. Michael Gillespie can be reached by phone at (909) 537-5027, by fax at (909) 537-7028, or by email at mgillesp@csusb.edu. Please include your application identification number (above) in all correspondence.

Best of luck with your research.

Sincerely,

Samuel S. Kushner, Chair
Institutional Review Board

SK/mg

cc: Prof. Eun-Ok Baek, Department of Science, Math, and Technology

CALIFORNIA STATE UNIVERSITY
SAN BERNARDINO
Institutional Review Board (IRB)
Academic Affairs
California State University, San Bernardino
Research and Sponsored Programs
Ph: (909) 537-5027 Fax: (909) 537-7028

March 7, 2008

CSUSB INSTITUTIONAL REVIEW BOARD
Protocol Change
IRB# 07016

APPROVED

Mr. Brian Lafferty
c/o: Prof. Eun-Ok Baek
Department of Science, Math, and Technology
California State University
5500 University Parkway
San Bernardino, California 92407

Dear Mr. Lafferty:

Your protocol change in your application to use human subjects, titled, "Improving Military Training Through Constructivism and the Web" has been reviewed and approved by the Chair of the Institutional Review Board (IRB). A change in your informed consent, for expedited and full board review only, requires resubmission of your protocol as amended.

You are required to notify the IRB if any future substantive changes are made in your research prospectus/protocol, if any unanticipated adverse events are experienced by subjects during your research, and when your project has ended. If your project lasts longer than one year, you (the investigator/researcher) are required to notify the IRB by email or correspondence of *Notice of Project Ending* or *Request for Continuation* at the end of each year. Failure to notify the IRB of the above may result in disciplinary action. You are required to keep copies of the informed consent forms and data for at least three years.

If you have any questions regarding the IRB decision, please contact Michael Gillespie, IRB Secretary. Mr. Gillespie can be reached by phone at (909) 537-7588, by fax at (909) 537-7028, or by email at mgillesp@csusb.edu. Please include your application identification number (above) in all correspondence.

Best of luck with your research.

Sincerely,

Sharon Ward, Ph.D., Chair
Institutional Review Board

SW/mg

cc:

909.537.5027 • fax: 909.537.7028 • http://irb.csusb.edu/
5500 UNIVERSITY PARKWAY, SAN BERNARDINO, CA 92407-2393

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