DEVELOPMENT OF A GAME-BASED MOTIVATION STRATEGY FOR A COLLEGE COURSE

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DEVELOPMENT OF A GAME-BASED MOTIVATION

STRATEGY FOR A COLLEGE COURSE

A Project

by

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Spring 2010

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Dedicated to

the Bahá'í Martyrs in Iran,

who were denied their rights to receive an education.

They have provided me the strength to continue mine;

And to my parents

Phillip C. and Fedora L. McPherson,

who cultivated the hunger for learning in my soul.

From your very

grateful and blessed daughter.

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The main goal of this project was to improve the online learning experience of adult learners enrolled in the Women in American History hybrid course at Butte College. A Game-based Motivation Strategy was created to address the lack of motivation expressed by students while working in the online component of the course. It consisted of two major parts: 1) Game playing, and 2) Game content development.

The Strategy was designed to be delivered over one academic semester and integrated with the instructor's delivery of WIAH course curricula. Given the motivation problem, the affective domain of learning was addressed using Main's (1992) Integrated Motivation Instructional Design (IMID) model. Assessment instruments and a formative evaluation plan were developed to aid in the delivery of the Strategy. For the first several weeks eighteen students were introduced to and played games online that featured women from the WIAH course subject matter. During the ninth week, the students

participated in the game content development activity, which allowed them to research women assigned by the instructor and develop questions and answers for new games.

Using Kirkpatrick's (1975) approach, the overall focus of the evaluation was on learners' reaction to components of the Game-based Motivation Strategy. The designer aimed to evaluate at Level 1 the achievement of seven affective domain objectives. Additionally, there was an attempt to evaluate the perceived learning (Level 1) and actual learning (Level 2) from one cognitive domain objective centered on course subject material. The evaluation did not check for learning outcomes beyond what learners perceived or actually achieved in the short time engaged with the Strategy's components. The evaluation consisted of usability tests of the games' design, function, and navigation; and focus groups and surveys to assess learners' attitudes about game playing, game content development tasks, and the use of games' as course assessment tools.

Evaluation of the Game-based Motivation Strategy revealed some successes and some ineffective aspects. Weaknesses were shown in design of the games in terms of aesthetics and capacity to allow the user more freedom with the game structure and content. Nevertheless, students agreed their online learning experience was made more interesting by playing the games; over half were motivated to read more about women in American history after playing the games, which was rated as a favorable activity; students indicated developing content for the games helped them reflect on experiences of the women they were researching; and that their recall of information in the course was better having participated.

CHAPTER I

INTRODUCTION

Statement of the Problem

The overall purpose of this project was to develop games to improve the online experience of adult learners enrolled in the Women in American History (WIAH) course at Butte College. Tyra Benoit instructed the course and served as subject matter expert (SME) in the area of content development for the games. An effort was made to address the lack of motivation exhibited by students while online. Through the process of evaluating the design and usability of the online games and collecting information about the attitudes of adult learners on game playing and game content development, games in the online environment could serve as an effective motivational strategy for learning. A goal of the project was to increase learners' appreciation for contributions made by women in American history.

Purpose of the Project

Why use games? Researchers surmise a variety of benefits about games as effective teaching and learning strategies. Some game strategies provide an environment in which players can solve problems and make decisions (Eglesz, Fekete, Kiss, & Izso, 2005). Foreman (2003) suggests games provide opportunity for prompt instructional responses as well as provide the learner a means of evaluating learning progress

(as cited in Azriel, Erthal, & Starr, 2005). Other research describes games as learning events that engage and involve learners. Games also have the ability to induce learners' natural drive toward achieving a goal. Both of these are essential to effective learning environments (Paras & Bizzocchi, 2005). Aside from game play, games are versatile agents for learning with game creation as one way to embark on game-based instruction methods (Johnson & Smith, 2006).

To enrich the online component of the WIAH course, the designer devised a two-fold game-based motivation strategy that allows students to develop content for games and then play them online. The first part of the strategy consisted of students playing the games. The second part incorporated an element of game creation whereby students participated in a game content development activity. The content for the games was associated with specific women in American history and based on the research conducted by students in the course. Additionally, for multiple perspectives, students played the games of their classmates.

To test the effectiveness of the game-based strategy, the designer conducted formative usability evaluations of the game content development process and the games' design, function, and navigation. Focus groups and surveys were used to assess learners' attitudes about game playing and content development actions. Additionally, a survey of learners' attitudes on the use of games' as course assessment tools and as a means to engage learners when online was addressed. Details of the evaluation process are explained in Chapter 3, Methodology.

The intended audiences for evaluation results were instructors and course developers of adult learners.

Deliverables of the project consisted of two parts: 1) The Game-based Motivation Strategy Delivery Plan and 2) Web page files containing the resulting student game prototypes. For evaluation purposes only, the web pages with games were uploaded to a designated WIAH website linked to WebCT.

Scope of the Project

The format of the project was game-based. Four game types were designed using the eGames Generator, an online game generator application, created by Carson Learning Services (CLS). Developed as prototypes, the games, if fully implemented, would be used in future WIAH classes to not only motivate students to read more about the subject matter but also serve as course assessment tools when students engage in their online assignments. Moreover, another goal would be to help increase student appreciation for the subject matter.

The designer's belief was that the practice of students playing the games with content developed by their peers would give an opportunity to experience course concepts from different perspectives, while also providing new opportunities for collaboration.

The content of the games pivoted around the life experiences and contributions of outstanding women from the Pre-Columbian, Renaissance, Enlightened, and Industrialization Eras to the Modern Era.

The targeted audience for the games was students at Butte College enrolled in WIAH hybrid courses. Students were required to attend live lectures in class and do online assignments outside of the classroom. It was hoped that this two-fold motivational

strategy would not only enhance students' online experiences while in the WIAH course, but also serve as a model strategy for other hybrid courses offered at the college.

Significance of the Project

Research presents gaming trends in business industries and academic institutions around the globe. In the Horizon Report, Johnson and Smith (2006) consulted leading academic representatives, corporate and technology professionals, and examined widely reported information considered by knowledgeable people in industries such as technology and higher education. After conducting qualitative research methods, they reported six domains of technology that are surfacing and posing major changes in colleges and universities between 2007 and 2011. Educational gaming was one of the technologies rapidly growing given the increase in scientific research on gaming as serious learning instruments. Furthermore, it was rated for its untapped applicability in areas of instruction and learning as well as for its demonstration of innovation and creativity.

The report also revealed that more inquiries were being made concerning various game and play theories, the impact of game application in the learning environment, the accommodating framework of game design, and the interest of many instructors in improving learning facilitation using games. Moreover, for adult learners, educational gaming research implies significant impact on their learning (Johnson & Smith, 2006).

Some instructors are experimenting with games as part of their instruction. According to Becker (2005), since most instructors do not integrate games into the

classroom without knowing their benefits, research on game play in such learning environments is scarce.

Though there are few who are willing to try games in their curriculum, what made this project significant was the fact that Benoit was willing to test game playing and game content development as part of her hybrid class, thus adding to the much-needed research about games and the adult learner.

Intended Effects

Based on the project's learning objectives and the use of games to deliver course content, intended effects of the intervention were to provide learners novel and interesting ways to:

- become motivated to read more about women in American history.
- self-assess their comprehension of the course material.
- prepare for course quizzes and exams.
- have a more interesting online learning experience, and
- gain increased appreciation for women and the contributions women have made toward the development of American society.

Formative evaluation of the game designs and the game content development process as a two-fold motivation strategy yielded the aforementioned intended effects for the majority of students in the course. Details of the results are in Chapter IV.

Limitations of the Project

The scope of this project was limited to an evaluation of design and usability for improving the quality of the developed games. It also included the assessment of

adult learner attitudes toward game playing and participation in game content development.

To analyze long-term knowledge retention was not within the scope of this project. However, in a post-game development and game-playing questionnaire taken by learners at semester's end, a retaining of facts was measured as part of evaluating the learners' actual learning versus perceived learning after participating in the content development process and the game playing activities within the framework of this project.

The designer and SME discussed the possibility of implementing simulations for engaging learners' higher order thinking skills. Simulations designed appropriately, emphasizes such benefits as cooperative learning, application, problem solving, and decision-making (Sottile, Jr. & Brozik, 2004). However, the designer did not have at her disposal the amount of time and finances required for producing game simulations that would entail detailed narratives and software programming. As an alternative, the designer and SME decided on a set of game templates chosen from CLS using its eGame Generator software, which allows users to generate learning games for any educational purpose at no cost.

Developing games from scratch was not necessary to meet the objectives of this project. Therefore, game development pertaining to challenges of programming, algorithms, artificial intelligence, software development and engineering, operating systems, computer architecture, networks, or other areas related to game development in the field of computer science was not the focus. Making use of CLS game templates that met specific learning needs, design specifications, and that allowed achievement of the

project's goals and objectives, proved cost-effective and was an efficient use of the designer's time.

The designer developed a correlating game content development activity introduced in the course and completed by students within one academic semester. The designer was careful not to infringe on the instructor's time and existing classroom teaching strategies, which included live lectures, PowerPoint presentations with rich media of historical images and video.

Aside from the game activities being instructional and informative, the attempt was to make learning enjoyable. It was within these contexts that the games and the game content development process were designed and evaluated.

Since the version of the WebCT course management software at Butte College was not fully SCORM (Shareable Content Object Reference Model) compliant during the production of this project, games could not be installed to allow students' game scores to be assessed by the instructor. Therefore, the designer did not use the game scores as part of the evaluation goals. Moreover, due to the time constraints to complete the project, the games were not developed beyond prototypes nor were they fully implemented.

Definition of Terms

Affective Domain

One of three learning areas established by Bloom (1956) and Krathwohl (1964) that pertains to the learner's emotions and are associated with a range of conditions and feelings such as, attitudes, motivations, self-concept, values, and beliefs.

Attitudes

A class of learned capabilities associated with the affective domain causing one to have a favorable or non favorable disposition toward an individual, an event, or object (Gagne, Briggs, & Wager, 1988).

Computer-based Shell Games

Games that allow the reloading of content, are commonly displayed on computers, and also represent a unique kind of framegame (Thiagarajan, 2003).

Framegame

A type of instructional strategy that engages and compels learners to discern between and relate key types of knowledge in a specified subject area (Beissner, Jonassen, & Yacci, 1993).

SCORM

Stands for *Shareable Content Object Reference Model* and specifies interoperability of content for online learning as well as how the content is accessed and reused.

CHAPTER II

LITERATURE REVIEW

Introduction

Research indicates that the literature review provides foundational support for work done in the field of performance improvement and instructional technology (Marrelli, 2005). For this instructional design project, it ensures the game activities created as a motivational strategy for the "Women in American History" course at Butte College, have an empirical basis for an effective outcome. That is, what are the effects of web-based games, game playing, and game content development on the attitudes of adult learners? Do they increase students' motivation to engage longer with the subject matter? Do they improve students' online learning experience? Thus, to help answer these questions and inform the designer's decisions, the following literature review examines important aspects of digital game-based instruction and the adult learner.

The review is divided into three parts. The first part provides context for the games used in this project. It identifies the characteristics and classifications of games, introduces game trends, and offers evidence on the benefits of game-based learning. Part 2 presents research about the learner's affective domain, attitudes, and motivation factors that are essential considerations in the design of game-based instruction for the adult learner. Part 3 concludes the review with an introduction of the instructional design

model, which systematically guided the designer in the design, development, delivery, and evaluation processes of the overall project.

The designer surveyed three genres of literature (academic, professional, and business) relevant to the field of instructional design and technology. In order to build a strong knowledge base, it was important for the designer to examine the underlying concepts, theories, and principles of game-based learning from a multi-perspective (Marrelli, 2005); therefore, this literature review was expanded to include publications in related disciplines as well as the discipline of instructional technology.

The following databases of preliminary sources were searched: 1) The Educational Resources Information Center (ERIC); 2) The Current Index to Journals in Education (CIJE); 3) Academic Premier Search; 4) Business Source Premier; 5) PsycInfo and 6) Applied Science and Technology.

Additionally, articles explored were from the Journal of Special Education, Journal of Education for Business, Journal of Interactive Online Learning, Quarterly Review of Distance Education, British Journal of Educational Technology, Training and Development Journal, Performance Improvement Quarterly, and the Society for Academic Gaming and Simulation in Education and Training (SAGSET).

Keywords used in the searches included “instructional design,” “online instruction” “motivation,” “attitudes,” “affective domain,” “educational technology,” “games,” “game-based learning,” “adult learning,” “learning strategies,” and “learning theories.”

Context for Games

"Let my playing be my learning and my learning be my playing" Johan Huizinga (as cited in Art and Popular Culture, 2009). This quote encapsulates the essence of this project.

Johan Huizinga, a Dutch historian is one of the foundational figures studied in game design and development programs according to Hector Rodriquez (2006), a contributing research writer for the online International Journal of Computer Game Research.

Huizinga wrote the book, Homo Ludens (Man the Player). Rodriquez (2006) elaborates on Huizinga's claims that play is not only one of the manifestations of culture but it is central to it. Everywhere is seen demonstrations of imaginative spontaneous activity, theatrics, exhibitions of expert abilities, competitors pursuing challenges over self or over others for high distinction, and the widespread influence of playfulness in the consciousness of society (Rodriquez, 2006).

Although computer game play consists of elements that differentiate it from the definition of play noted by Huizinga, this project takes into consideration the ludic (playful) attitudes of its target audience, namely women from the ages of 18 to 24, and the necessary conditions of computer game play that support their attitudes. According to one research report on adult learners, game playing has some defined objectives and limitations but falls under the general category of playing (de Freitas, Savill-Smith, & Attewell, 2006). The following section describes characteristics that provide the framework, *aims and boundaries*, in computer game environments.

Game Characteristics

What are the characteristics that define an activity as a game? Prensky (2001) presents six key structural elements that make up computer games. One element is Rules, which differentiates games from other kinds of play. Another is Goals and Objectives, whereby achieving goals is a major motivation for the learner. Outcomes and Feedback are a third element that provides the means by which a learner measures her or his progress against the goals. A fourth element is conflict, competition, challenge, or opposition, which presents the problems to solve in a game. Interaction, both with the computer and socially with other people, is a fifth element. And a sixth element, representation or story, which is what the game is about (Prensky, 2001).

Thiagarajan (2003) provides four critical features that distinguish a *game*: 1) conflict—accomplishing a game's goal is inhibited by barriers; 2) control—directives for playing the various features of a game; 3) closure—a stipulation that signifies the game is over and 4) contrivance—inept machinations in game design interactions (Thiagarajan, 2003).

Both Prensky's (2001) and Thiagarajan's (2003) game characteristics shaped the context for games used in this project.

Game Classification

In its 2006 Casual Games White Paper, the International Game Developers Association (IGDA) has attempted to classify the wide variety of online games. The designer used IGDA's classification of online games to determine the genres of games and game-play styles played by the project's target audience. The game-play styles identified for this audience fall into the category of Casual Games described in IGDA's

classification. Although casual game players are mostly women, age 35 and over (Marketing VOX - Voice of Online Marketing Website, 2006), they are found among other age groups and audiences, such as, college students (Jones, 2003).

Casual games are described by IGDA (2006), as uncomplicated, requiring little effort to master, and simple to operate. Being online is one of the primary points of access for casual gamers. The opposite drivers of competition games drive casual game play. Casual gamers play for relaxation, diversion, socialization, and community (International Game Developers Association, 2006).

Some of the popular game mechanics identified was puzzle games and matching games, which dominate casual game styles. Moreover, they align with the relationship pattern strategies inherent in the design of some computer-based shell games, which Thiagarajan describes as unique types called framegames. A distinctive feature of the framegame is its ability to allow the loading of new information (Thiagarajan, 2003).

Selection of games for this project was informed not only by an analysis of game characteristics and game classification, but also by the trends in the casual game market associated with the target audience.

Trends in the Game Industry

The pervasive act of play is evident everywhere in American culture today and it is heightened with the increase of digital game technology and other trends in game playing behavior.

One trend appears among the age group (18-24), which makes up the traditional student enrollment of most universities and colleges in the United States. Research revealed that playing games for most college students was a daily or routine

occurrence where gaming served as a favorable temporary diversion between classes or study periods (Jones, 2003). According to Jones (2003), the majority of students indicated positive attitudes about their involvement with gaming.

Between January and February 2005, a random survey by Nielsen's Entertainment Interactive Group revealed gamer demographics and gaming behavior that showed an increase of game playing in the United States. More than 1500 individuals were questioned. Older women mostly over 40, made up the majority of the casual online game audience, but evidence showed that emerging consumers were women 18 to 24 years old and by comparison, they spent more on leisure, diversion, fun, etc. as well as had extra time at their disposal (Nielsen Entertainment's Interactive Group, 2005).

Another trend is indicated by the improved facilitation of casual games online, which have made games more accessible to female players (International Game Developers Association, 2006).

Furthermore, two market forces based on consumer behavior significantly affect the casual game industry: 1) consumers are spending more time online compared to watching television or listening to music; and 2) consumers are increasing their game play capabilities and comfort with gaming (International Game Developers Association, 2006).

These trends in digital game playing suggest the powerful influence games have on holding one's attention for a length of time, and in some cases, for more than one or two hours per week (Nielsen Entertainment's Interactive Group, 2005).

It is the designer's belief that integrating elements that comprise casual games into the design of framegames for the online learning environment is consistent with the

aforementioned game playing behavior of the target audience. There are also implications that game playing is a favorable stress reducer—a motivating factor for adult learners.

Game-based Learning Benefits

Research shows the potential benefits of using games in adult education. Educational implications have been explored since the seventies and eighties. O'Neil, Wainess, and Baker (2005) postulated that computers showed promise for instruction with their capacities to incorporate games and address learners' affective domain.

However, adults are one group of learners with specific requirements. This point was emphasized with a series of studies that sought to increase motivation levels (the focus of this project), improve learner retention, and widen participation among adult learners. Researchers for the Learning and Skills Research Center, a research organization associated with the Birkbeck University of London, reported a wide range of case studies between 2004 and 2006 on effective game-based learning (GBL) practice. The studies examined the use of computer games and simulations by different groups of adult learners in a variety of contexts and considered the serious use of play by adults for e-learning. Key findings from the studies suggested that games: motivate learners; nurture self-confidence and self-esteem in some learners; reengage learners; aid retention in learning (as measured by completion rates); support learners' skill needs; and support collaborative learning (de Freitas et al., 2006).

Other research by Jacob & Dempsey (1993) and Oxford & Crookall (1988) noted the benefits of games for developing higher order processing skills. Games may improve cognitive learning strategies, such as self-monitoring and evaluation, affective

strategies that lend to anxiety reduction and self-encouragement, and memory strategies such as grouping and structured review (as cited in Hogle, 1996).

Although there are mixed feelings about the benefits of games in education, O'Neil et al. (2005) presumed the instructional design of games is the reason for most positive aspects of games, rather than because of the games themselves.

Along this line of reasoning, Becker (2005) offers a way to help educators overcome resistance to games. She purported one way is by matching the attributes of games with well-known instructional models and learning theories.

The literature revealed the attempts of some researchers to illuminate the value of games in formal education (Becker, 2005; Bixler, 2006; Karoulis & Demetriadis, 2005). For example, Becker (2005) explained how "good" games meet the criteria of Howard Gardner's Multiple Intelligences and Gagne's Nine Events of Instruction. Bixler (2006) examined the importance of motivation in educational games and proposed the use of instructional design models with overt motivational components such as, John Keller's ARCS model, Malone's and Lepper's Taxonomy of Intrinsic Motivations for Learning, and Csikszentmihalyi's Flow Theory. Similarly, Karoulis & Demetriadis (2005) proposed a motivational matrix to match educational game attributes to one or more factors of Keller's ARCS model.

Before moving into discussion on the models that guide the instructional design and motivational factors related to this project, it is important to explore the affective domain of learning and its relationship to attitudes and motivations.

The Affective Domain, Attitudes, and Motivation

Affective Domain

The affective domain relates to the feelings and emotion states of the learner as well as the human behavior associated with those states. Affective objectives, for example, focus on beliefs, motivations, attitudes, etc. (Krathwohl, 1964).

The literature revealed educational taxonomies (Bloom, Englehart, Furst, Hill, & Krathwohl, 1956; Krathwohl, Bloom, & Masia, 1964) that help instructional designers understand the relationship of the affective domain to other learning domains. Krathwohl (1964) explained three separate domains: cognitive, affective, and psychomotor, established to categorize educational performance-based objectives for designing effective instruction.

The focus of each domain is different. Increasing learners' knowledge is the focus of cognitive objectives. For affective, it is changing learner's attitudes; and for psychomotor, it is building learners' skills (Rothwell & Kazanas, 1998, p. 159).

Though the taxonomy set forth by Bloom et al. (1956) and Krathwohl et al. (1964) have been accepted by many educators over the last five decades, the researchers agreed that the affective domain is the most difficult to define and measure due to the emotion states associated with it. However, in an attempt to clarify the affective domain for measurement purposes, Krathwohl et al. (1964) proposed a taxonomy that showed emotion states associated with affective learning in a classification system as follows:

1. Receiving – (lowest level) attending to; awareness of; willingness to receive; selected attention

2. Responding –actively attending to; acquiescence in responding; willingness to respond; satisfaction in response

3. Valuing –acceptance of a value; preference for a value; commitment

4. Organization –conceptualization of a value; organization of a value system

5. Characterization by a value or value concept (highest level)—generalized set of controlling tendencies; characterization or integration of beliefs into total philosophy or world view. (Krathwohl, 1964, pp. 29-33)

The emotion states were organized based on a process of learning, which is internalized. The theory of *internalization* refers to the unconscious acquiring of knowledge whereby the learner instinctively becomes cognizant of an entity in the lower levels, then incorporates beliefs about it in the higher levels to the extent that attitudes are adopted, and inherent judgments are assumed thereby affecting her or his actions (Krathwohl, 1964).

It is the belief of the designer that the impact of subject matter on one's emotions implies that affective objectives should align with the various emotion states learners will pass through and internalize during the learning process. For example, in order to influence students' attitudes in the WIAH course, the designer must be clear about the affective outcomes. One of the lower-level outcomes is for learners to receive or respond to the various achievements made by women in American history. However, the preferred higher-level outcome revolves around learners valuing the contributions women have made in American history with the goal of influencing learners' behavior (i.e., choosing to read more about the subject when online or supporting women in the larger society).

Attitudes

Attitudes in context of this project refer to the learners' ability to make decisions about learning the subject matter when online as well as the learners' willingness to take part in learning through game playing and game content development activities.

Although varying positions exist in research efforts to define attitudes, Gagne's, Briggs', and Wager's (1988) definition most adequately describes how they are viewed in the instructional context of this project. They define attitudes as a class of learned capabilities associated with the affective domain causing one to have a favorable or non-favorable disposition toward an individual, an event, or object (Gagne et al., 1988).

This internal state implies for instructional designers that learners come to a learning situation with already set values, beliefs, or feelings about the instruction they will be presented with, as well as about how they will achieve the learning objectives.

For this designer, it implied an assessment not only of students' attitudes about the motivation intervention for the WIAH course online learners, but also of their attitudes about online learning in general.

Though, many researchers and learning theorists approached the process of attitude change differently (Bednar & Levie, 1993; Martin & Briggs, 1986; McDonald & Kielsmeier, 1972; Simonson & Maushak, 2001; Smith & Ragan, 1999; Wetzel, Radtke, & Stern, 1994; Zimbardo & Leippe, 1991), many agreed with Simonson's and Maushak's (2001) views about attitudes; they are learned through experiences and susceptible to alterations.

Consistent with some of the emotion research in the field of psychology, evidence from neuroscience research shows the transformative power of emotions on attitudes. LeDoux (1996) reported, most emotions occur independently of the cognitive systems and can significantly color the cognitive process and its output or decision (as cited in McCraty & Childre, 2003). He explained that emotions perform faster circumventing the thought processes of the mind, which comprise reasoning capabilities that function typically in a linear fashion.

According to McCraty & Childre (2003), transformation of negative thoughts, attitudes, and behaviors to more positive outcomes may be more effective by accessing the emotional system, which has a direct means of changing long-standing attitude patterns. (McCraty & Childre, 2003).

This approach is significant for this project because attending to the affective domain with the appropriate positive interaction for the online learner can decrease negative emotions brought about by online-learning barriers, which are discussed along with motivational instruction in the next section.

Motivation

Motivation is discussed in this section to show its relationship to the learning domains—particularly the affective, and its role in affecting adult learners' attitudes through games. This section also supports the designer's rationale for designing a motivational strategy that reinforces opportunities for adult learners to express positive attitudinal goals.

Martin Ford's (1992) Motivational Systems Theory (MST) best defines *motivation* for the context of this project. It is represented with a formula whereby "emotions" is one of three interacting components:

Motivation = Goals x Emotions x Personal Agency Beliefs.

From research previously mentioned, "emotion states" are associated with the affective domain. The formula implies there is a link between motivation and the affective domain through the emotions. Emotions help one to evaluate whether a goal is obtainable. In terms of learner motivation, the emotions component is not ranked or preferred over the others in the theory, even though emotions may be independently observed for assessment purposes. All three components must be present in a particular episode for the learner to be motivated (Ford, 1992).

For this reason, Ford (1992) proposed motivation as an interactive construct. MST suggested that equal weight is given to cognitive factors (goals and beliefs) that interact with emotions during the motivation process. According to Ford (1992), goals serve to direct the learner, emotional arousal processes serve to energize the learner, and personal agency beliefs serve to regulate goal-directed activity, which in fact, is the kind of activity that many games represent (Prensky, 2001; Stolovitch & Thiagarajan, 1980).

Researchers in the education and instructional design fields have examined the relationship between motivation and adult learners. For example, Hancock (1994) conducted a motivational study that supports the idea that when appropriate motivational constructs are strategically placed in the instruction according to adult learners' needs, they will learn better and with higher levels of motivation (Hancock, 1994).

The study implied in order to prevent lack of motivation in adult learners, serious consideration should be given to adult learning principles. Adult learning needs, which are central to Andragogy, are premised on six assumptions identified by Knowles, Swanson, and Holton (2005) as follows:

1. Necessary knowledge—Adult learners want to know the value of learning something. They ask why it should be learned.
2. Self-concept – Adult learners see themselves as self-directed learners who are capable and responsible for their lives.
3. Prior experience – Adults have life experience, which increasingly becomes a rich resource for learning.
4. Readiness to learn – Just-in-time learning is the learning orientation for adults.
5. Learning orientation—Adults orient their learning for the purpose of performing important tasks or solving problems in their lives.
6. Motivation – Internal desires such as, self-fulfillment and self-esteem, are more influential on adult learning than external motivators, such as better working hours or higher pay. (Knowles, Swanson, & Holton, 2005)

Adult motivation in assumption six aligns with the definition for intrinsic motivation factors—self-driven, central to achievement, and development toward life-long learning—noted from the LSRC study discussed in the previous section. Assumption two, self-directed learner, implies a connection to Ford's (1992) personal agency beliefs factor, self-efficacy—playing an important role in regulating goal-directed activities, which comprise adults orientation to learning described in assumption five.

In terms of the relationship between games and attitudes, research suggested that games contain elements that encourage attitude assessment and experiential learning. Furthermore, games provide opportunity for learners to face their own attitudes and beliefs (Silberman & Auerbach, 1998). This action implied an important step toward the goal of attitude change. The ability to attend to one's attitudes during the learning process is possible when learners are involved in immersive interactivity where problems are solved and decisions are made (McKeachie, 2002).

Because this project concerns lack of student motivation in the online learning component of the WIAH course, it is important to examine some of the learning obstacles associated with online learning. According to Bixler (2006), instructional designers need to be aware of at least three online learning barriers to motivation: isolation, frustration, and academic persistence.

Students in an online learning environment need clear and timely feedback as well as knowledge of what is expected of them to reduce feelings of isolation from their classmates or instructors (Hara & Kling, 1999) .

According to Hara and Kling (1999), it is easy for students to become frustrated in online learning environments. Their research shows that technological issues and ambiguous instructions contribute to this problem and need to be considered when developing instruction for and instructing in the online environment.

Academic persistence refers to learner motivation to continue a course. Cookson (1990) noted that dropout rates are often caused by the learning environment, work and domestic constraints, and perceptions of not being successful in the course.

Under these circumstances, Bixler (2006) suggested that designers present learning in a way not perceived as beyond learner achievement.

There is evidence that games contain motivational constructs that can also help combat barriers to motivation. They can help reduce any tensions that the learner might have and support self confidence and self-esteem because they promote a sense of achievement as the various levels or stages in a game are completed (Foreman, 2003; Prensky, 2001; Thiagarajan, 2003).

Surmised from the literature are several important themes about the relationship between motivation and game design for instruction. For example, grabbing and maintaining student's attention; providing a perceived relevance between learner's needs and the instruction; building confidence through clear goals, navigation, feedback, and a safe environment in which to learn; and allowing adult learners control of the environment. These are key motivational elements to help make the learning experience a satisfying one (Bixler, 2006).

Instructional Design

Researchers describe instructional design (ID) as a process for defining problems that affect human performance and finding the solutions that effectively improve it (Rothwell & Kazanas, 1998). The instructional designer uses one or a combination of instructional design models that aid in systematic development of instruction, which includes a process for measuring learning outcomes expected to improve human performance.

Since game technology is used to deliver instruction in this project, it is helpful to distinguish between instructional design and instructional technology as these terms are often used interchangeably and research suggested an inter-correlation exists between them. According to Ely (1999), instructional technology is a construct of two sciences: 1) Behavioral science, the psychology of learning and instruction, and 2) Physical science, hardware/software configurations that deliver education and training. He added that instructional design or instructional systems design commonly represents the psychological science construct (Ely, 1999). Moreover, he noted there was growing evidence that design is a more powerful influence on learning than the technology that delivers the instruction.

This implied that choosing appropriate instructional design models are important to successful learning outcomes. Given that motivation is a primary factor in the design and development of game activities in this project, the designer examined Main's (1992) Integrated Motivation Instructional Design (IMID) Model for guiding the overall project and ensuring that the affective domain is addressed in all phases of the instructional design process.

The model combines the five phased instructional systems design (ISD) model used by the military services (NAVEDTRA 110A, 1981) with the motivational components of instruction described by John Keller (1983) as ARCS (Attention, Relevance, Confidence, and Satisfaction) (Main, 1992b). Using a rectangular grid of columns and cells, Main (1992) labeled the top of each column with one of the five phases (Analysis, Design, Development, Implementation, and Evaluation). Listed down the left side of the grid are Keller's (1983) motivational components. Formative

evaluation (Validation/Feedback) is depicted by a cell at the bottom of the rectangle that spans the length of all the columns indicating an ongoing process (not necessarily linear) of two-way information between the phases to ensure tasks are reviewed and approved along the way.

Other researchers have designed circular models that illustrate the dynamic non-linear process of instructional development (Iverson & Colky, 2004; Morrison, Ross, & Kemp, 2001). The attempt is to show flexibility, and that beginning the process may be at more than one point with an ongoing exchange of information and ideas between the different elements (Morrison et al., 2001).

In line with these reasons, this designer arranged the components of the IMID model into a circular representation to emphasize validation and feedback as more central to the design process of this project. As stated previously, validation and feedback serve as ongoing formative evaluation in the IMID model. Information inputs and outputs can move uninhibited across the phases and allows for improvement in the overall process (Main, 1992b).

Bearing this in mind, the designer did not seek to change the meaning of validation or feedback in the process, but rather offered a *circle* as a more representative demonstration of its function in this project. Likewise, in the circular representation, the ARCS function does not change and is indicated in each phase linked by a blue line circle (see Figure 1).

Unlike some models with veiled or implied motivation components, the IMID model with its overt motivational component (ARCS) aids the instructional designer in attending to learner motivation throughout the instructional design process. The purpose

of each phase along with learner motivation considerations are addressed in the following sections.

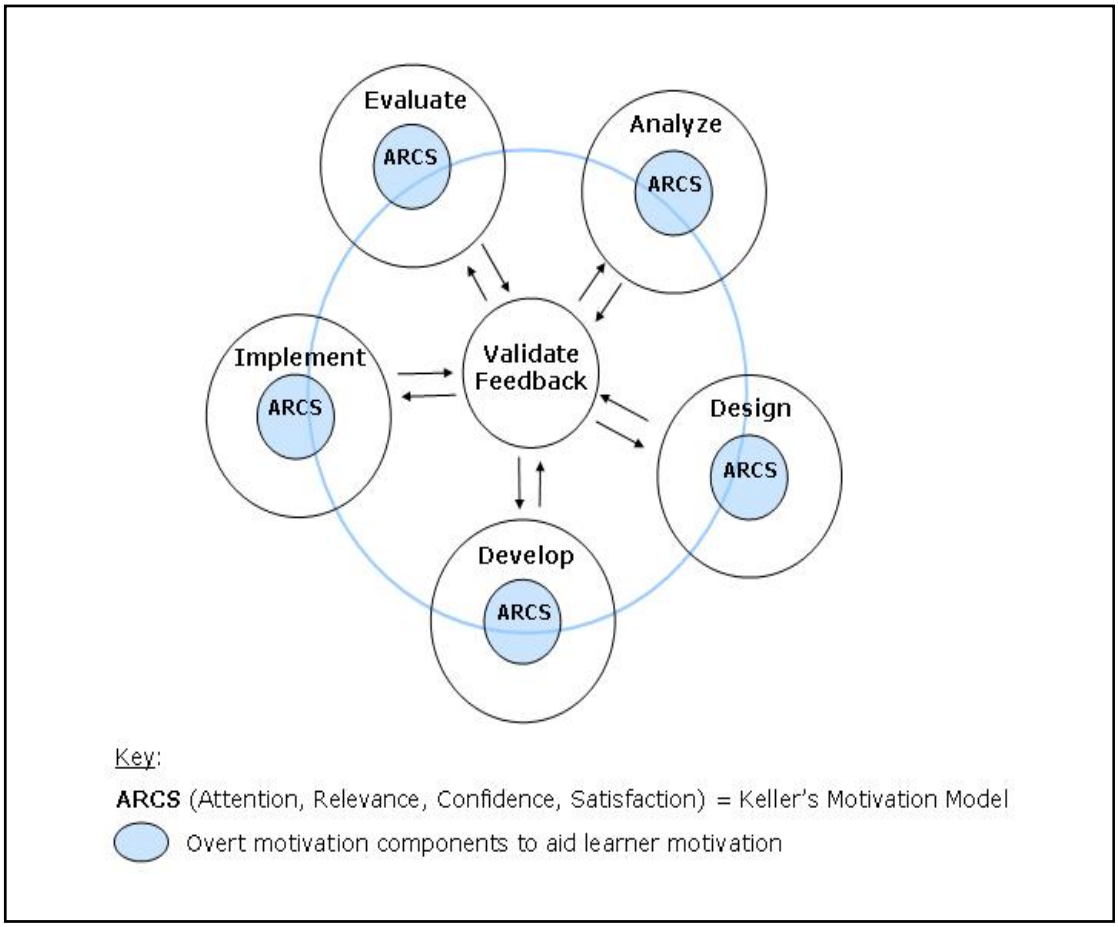

Figure 1. IMID Model Displayed Circularly

Analysis

Paramount to most instructional design approaches is the analysis phase. It provides the foundational information on which all the remaining phases depend. In this phase, the performance need, opportunity, or problem and its cause are identified. A need is defined in the literature as a gap between where performance is and where performance

should be (in terms of competent knowledge, skills, attitudes, and abilities) (Rothwell & Kazanas, 1998). Possible solutions are also determined in the Analysis phase. One means toward a solution is to establish the target group's current level of performance and the expected level of performance and then determine how best to close the gap between the two.

In terms of using ARCS in the analysis phase, Main (1992) recommended the four-part motivation components as follows:

- *Attention* in this phase includes determining both the learners' interest in the subject matter and the instructional needs to arouse the students' curiosity.
- *Relevance* includes analyzing the relationship between instruction and the personal and professional goals of the learner, then deciding how to emphasize this relationship.
- *Confidence* involves analyzing the learners' experience in similar learning situations and how to raise the students' expectancy of success.
- *Satisfaction* requires analyzing learners' needs for achievement and whether those needs are better served by extrinsic or intrinsic rewards. (Main, 1992b, p. 13)

Design

A Systematic Process. The design phase consists of defining the desired performance objectives, planning lessons and assessments, choosing the instructional approach, specifying the learning activities, and selecting the media delivery format (Rothwell & Kazanas, 1998).

As for the performance objective, three characteristics make it beneficial: 1) Expected performance, 2) Condition(s) under which performance is presumed to happen, and 3) Criterion or standard to which the performance should be done (Mager, 1997c).

After performance objectives and criterion measures have been developed, sequencing instructional activities should follow (Rothwell & Kazanas, 1998). Main (1992) offered recommendations to the instructional designer concerning sequencing instruction that correspond with appropriately organized content as well as performance objectives developed earlier in the process. Additionally, he referred to organizing content beginning with the least complex such as facts, and sequencing from there with more complex content, e.g., concepts, principles, and problem-solving (Main, 1992a).

When planning an instructional strategy, a designer must be able to combine knowledge of learning and design theory with information about the learners and the instructional objectives (Gagne et al., 1988). Rothwell and Kazanas (1988) explained that an *instructional strategy* is a plan that guides what and how content will be taught (Rothwell & Kazanas, 1998). They agreed with other researchers that instructional designers are free to select from many strategies that are appropriate to attaining the desired learning outcomes (Gagne et al., 1988; Julian & Boone, 2001).

The delivery system refers to how the instruction will be delivered to the learners. To clarify the concept, Mager (1997) made a distinction between delivery system selection and delivery media selection. Media is just one aspect of presenting instruction to learners. They are the things on which instructors write the information they want their students to receive, for example, chalkboards, computers, and overhead projectors. They carry messages (Mager, 1997a). In contrast, instructional designers may

use other ways to present instruction to learners. For example, they may use people, individuals who present information, participate in practice, and provide feedback. Additionally, they may use job related equipment or materials for a more authentic practice experience (e.g., real pianos for practicing and playing). Although these are critical for appropriately conveying instruction, Mager (1997) maintained that it is preferred to refer to this step as delivery system selection instead of media selection, given the mix of possibilities.

Rothwell and Kazanas (1998) used the term *delivery mode* and similar to Mager's (1997) view, noted that it should not be confused with media. However, they add it ought not to be confused with instructional strategy either. They refer to delivery mode as the conditions in which instruction is delivered (Rothwell & Kazanas, 1998).

The instructional conditions are clarified with Ellington's (1985) four basic choices on the range of delivery modes: 1) Mass instruction, involving many learners, 2) Group instruction, involving fewer learners, 3) Individualize instruction, involving only one learner at a time, and 4) Direct experience, involving real-time learning such as informal on-the-job training (as cited in Rothwell & Kazanas, 1998, p. 226).

Kaufman and Thiagarajan (1987) viewed media selection as one of a two-component selection activity (media-and-mode-selection). Their definition for media is in line with Mager's (1997). It is a vehicle for transmitting an instructional message. Distinguished from media, mode is the "collection of strategies and procedures through which instruction is delivered" (Kaufman & Thiagarajan, 1987, p. 137). They noted that lectures and games are examples of instructional modes and add that an instructional mode may often use different media.

Game-based Instruction. Next, a look at games as part of a delivery system in the context of this project is helpful.

According to Stolovitch and Thiagarajan (1980), use of familiar games in the learning environment is one example of sound instructional design practice. They have considered learning outcomes derived from the systems of play that make up games such as Tic Tac Toe, Matching, or Bingo. From such familiar games, Stolovitch and Thiagarajan (1980) developed templates or *framegames* to assist in meeting a variety of learning needs. The instructional framegame "represents a "contrived" situation with some elements of conflict and rules for the control of moves and the termination of the game" (Stolovitch & Thiagarajan, 1980, p. xiii). Additionally, it provides a standard process that permits the designer flexibility in updating content and customizing it to the different learning levels and goals of students. This particular feature of framegames (content changeability) facilitates the versatility and speed with which designers may design instructional activities. Stolovitch and Thiagarajan (1980) pointed out that framegames are a useful form of interactive instruction and their use reduces the time associated with developing instruction in most subject areas implying that framegames aid in effective and efficient instruction (Stolovitch & Thiagarajan, 1980).

Clifford (1981) explained the benefits of arranging instructional content in a game framework. He designed framegames as learning strategies to help his students understand important concepts and the relationships between them. His model included relationships only between concepts. Later researchers believed that games could successfully include procedures and principles to effectively impact learning outcomes

(Beissner et al., 1993). They identified three more patterns to add to Clifford's seven relationship patterns and defined them as follows:

1. Superordinates/Subordinates/Coordinates Pattern: a set of terms demonstrating a hierarchical relationship.

2. Sequence Pattern: two or more terms that are related to each other by their order.

3. Parts-Whole Pattern: two or more terms, with all but one term being parts of that term.

4. Associates Pattern: a key term with several terms related to it. Associates might be examples of a class or attributes of a concept.

5. Equals Pattern: two terms that can be used interchangeably.

6. Opposites Pattern: two terms that has opposite meanings.

7. Similarity Pattern: two terms that is closely related but not interchangeable.

8. Cause-Effect Pattern: two terms or groups of terms, the first of which causes the second.

9. Influence Pattern: two terms or groups of terms, the first of which can influence or contribute to the second.

10. Analogy Pattern: an even-numbered set of terms (usually 4) arranged in pairs, with each pair having a similar relationship. (Beissner et al., 1993, pp. 221-222)

As reported by Beissner et al. (1993), in a well-structured knowledge domain, framegames help learners recognize and understand relationships between different types of knowledge content, such as concepts, principles and procedures. They further noted that framegames could be successfully used for learners to check their understanding of

the knowledge acquired. Chunking information using visual patterns is an advantage of framegames that can improve learning and their non-complex structures increases facilitation into computer-based instruction (Beissner et al., 1993).

Accelerated Framegame Design. In today's digital era, framegame design is accelerated for computer-assisted instruction with the use of game-development software. Although there are a number of game development software programs available, few fit the profile needed for this project in terms of design time and cost and with the capabilities to create framegames that could be used successfully as noted by Beissner et al. (1993). Several require purchase and installation of software on a computer. Some are free software, but still require software installation on a computer. Software installed on a computer is a limitation for collaborative design efforts between instructor and students. Free online game development applications are a more attractive choice for this purpose. Only two claimed to have the intuitive interface or the game engine and design tools to ensure construction of games that would engage adult learners.

Füller, Rieger and Ihl (2005) introduced the GameCreator concept, an Internet application that allows users to design a customized downloadable game without programming skills. Users may create original games or modify the company's existing games. Additionally, they argued even though there is more work put out to create a game, there are advantages to self-produced games over games already made (Füller, Rieger, & Ihl, 2005). Even though the GameCreator concept allows online game design using templates and has potential for unlimited original game design, it is focused on informal games primarily for entertainment purposes.

Similar to the GameCreator in functionality and user-friendly operation is the eGames Generator, a product of Collaborative Learning Systems. Like GameCreator, the eGames Generator allows games to be developed online and downloaded to a computer. It also includes sample games or tutorials to assist the user in developing games. However, users only design games from a selection of templates supplied on the website. Unlike the GameCreator, the eGames Generator was constructed for the purpose of building and publishing games that are designed for any educational purpose. The author advocated, "high-return, low-cost learning" games for "learning and reinforcement" (Carson, 2006, p. 1).

Von Hippel and Katz (2002) recommended the following components that a game generating software must have to ensure the efficient transfer of users' knowledge from the game products they create:

- User-friendly operation: the user finds his way intuitively. The tool is clearly structured.
- Offer module libraries: basic functionality, that allows for a simple and efficient creation of new products. Users fall back on ready-made routines and designs, so that they do not have to start always from scratch.
- Provide "trial and error" functionality: the participants can improve their product by playing around with them through test runs on the computer. They learn to better evaluate the design while going through several iterations.
- Define a possible Solution Space: there exists a predefined solution space, in which the user can become creative, to ensure that the program is executable (as cited in Füller et al., 2005, Gamecreator Concept section, para. 1).

The eGames Generator software also offers playback of games, using a Flash player, on computers running such operating systems as Windows, Macintosh, or Linux. As long as a designer has Internet access, she or he is able to create eGames and distribute them right away over the Internet. The eGames are compatible with industry standard authoring software such as Flash, PowerPoint, and Breeze and they can be integrated into existing computer instruction whether online or offline (Carson, 2006).

Relevant Learning Theories for the Game-based Motivation Strategy

Many adult learners find themselves in hybrid learning courses that involve both classroom and online deliveries of instruction. Evidence in the research shows that hybrid-learning environments suggest a need for a blended learning approach (Bixler, 2006; Julian & Boone, 2001; Poindexter, 2003). The strategy for this project is based on a blend of the following learning theories and philosophies.

Constructivism. A theory rooted in philosophy, psychology, sociology, and education is an investigation concerned with the construction of knowledge, and with how meaningful understanding arises from the human being's experience. The theory is attributed to Jean Piaget (1930), a Swiss philosopher, natural scientist, and developmental theorist, who believed that *play* was significant to cognitive development in the human learning process. He formalized the theory with a model to demonstrate *learning knowledge* as an internalizing process, whereby a learner's knowledge and meanings associated with that knowledge are constructed from her or his prior knowledge and experiences (Piaget, 1954).

According to researchers today, a major theme of constructivist theory is that learning is an active process (Iverson & Colky, 2004). There is emphasis on learners participation to actively create meaning using social interaction or games as well as using their cognitive processes and incorporating prior knowledge (Leemkuil, de Jong, & Ootes, 2000). Berge (2002) defines *active learning* as learning that drives students to take responsibility for their own learning. It provides situations that foster students to organize what is to be learned instead of leaving this task up to the instructor. It engages students in reading, writing, speaking, listening, and problem-solving activities, while cultivating deep and critical thinking skills. For learners, there is increase motivation to learn through confidence in their own potential for learning.

Metacognition. This theory is concerned with self-knowledge, experiences, and beliefs that learners bring along with them when engaged in study or various situations. Some researchers refer to it as reflective knowledge that consists of cognitive self-appraisal and cognitive self-management (Paris & Parecki, 1995). When faced with circumstances that cannot be figured out from acquired experiences, the learner relies on metacognitive actions (Blakey & Spence, 1990). This self-regulation implies that a good learner needs to be able to manage her or his behavior and mental functions using various metacognitive strategies (e.g. define problems, find alternative solutions, customize research actions to available time and energy resources, judge, control, and monitor thoughts, evaluate level of satisfaction in decision-making, and prioritize daily changes in responsibilities.) (Blakey & Spence, 1990).

Gagne's Learning Theory**.** Game research suggests that games already contain elements that align with Gagne's (1985) learning theory. Gagne, Briggs, and Wager

(1988) describe nine external events that stimulate and support the internal learning processes. They may be combined and depending on the circumstance, not all of them may be used. Additionally, they may occur by a combination of external stimuli (e.g. actions from teacher, student, and instructional materials) (Gagne et al., 1988). The nine events of instruction are as follows:

1) Gaining attention
2) Informing learner of the objective
3) Stimulating recall of prerequisite learning
4) Presenting the stimulus material
5) Providing learning guidance
6) Eliciting the performance
7) Providing feedback about performance correctness
8) Assessing the performance
9) Enhancing retention and transfer. (Gagne et al., 1988, p. 182)

Assessing game features using the above events can aid the instructional designer in making better game-design decisions (Becker, 2005; Van Eck, 2005).

Hide-the-guide. Consideration is given to Wallace's (1997) teaching and training dimensions to help the designer define the role of game-based instruction in a hybrid-learning environment. Wallace divides instructors' delivery of instruction into four types: 1) Personality on the stage—the personal experience-oriented presenter, 2) Sage on the stage—the subject-oriented teacher, 3) Guide on the side—the skills-oriented trainer, and 4) Hide the guide—the interactive multimedia information designer (Wallace, 1997). The learning environment using the hide-the-guide approach according to

Wallace's (1997) matrix shows the setting is personal, communication is interactive, and delivery is digitized and customized as needed by users. In framegames, rules and answer hints comprise elements of the hidden guide, access to which learners have at their own discretion. This implies that designers ensure games using the hide-the-guide approach are tested on target users before full implementation.

Collaboration. This theory stems from cooperation. However, unlike cooperative methods, collaboration is a less structured instructional approach increasingly used in colleges and universities (Summers, Beretvas, Svinicki, & Gorin, 2005). Research suggested collaborative learning is a result of group interaction (Iverson & Colky, 2004) and can add to the increase and success of sustained learning among higher education learners (Poindexter, 2003). The implication for instructional design when incorporating the collaborative approach is to include opportunities for learners to achieve common goals and practice small group social skills (Iverson & Colky, 2004).

Discovery Learning. Research described discovery learning as an inquiry-based and experiential-based process that allows learners to explore and question a problem situation (Romiszowski, 1981). Learners discover possible solutions as they interact with the world on their own or with the help of guidance strategies. Given opportunities to use their prior knowledge and previous experience, they independently discover new information, deduce generalizations to meaningful applications, and personalize their learning through reflection and internalization (Bruner, 1966).

Romiszowski (1981) listed several types of discovery strategies that may aid learners in establishing their own cognitive learning strategy or in changing their attitudes: 1) Impromptu discovery, 2) Free exploratory discovery, 3) Guided discovery,

4) Adaptively programmed discovery, 5) Intrinsically programmed discovery, and 6) Inductive exposition (Romiszowski, 1981, p. 294).

The strategy most suited for this project is guided discovery, which involves objectives that are fixed. It guides the learner in terms of appropriate methods and conclusions. Implications for the learner according to Bruner (1966), is that a learner uses her or his own organizational skills to make sense of the learning context, discovering that which is consistent or related (Bruner, 1966).

Guide-on-the-Side. According to Wallace (1997), the guide-on-the-side instruction consists of a well-structured engaging activity that incorporates elements that influence the learner's attitude and behavior. It includes two-way communication and hands-on activities. This technique is consistent with the guided discovery method referred to by Romiszowski (1981).

Taxonomy for Intrinsic Motivations of Learning. Malone (1981) believed activities that are essentially motivating are equipped with the tools to engage and communicate effectively what is expected of the learner. To ensure such motivation-inducing tools are included in instructional activities, Malone and Lepper (1988) constructed a comprehensive two-part Taxonomy. The first part, *individual motivations,* guides instructional designers to use an optimal amount of challenge, curiosity, control, and fantasy engagement when developing activities (e.g. games). According to Malone & Lepper (1988), these factors provide stimulus for intrinsic motivation in the learner. The second part of the taxonomy, *interpersonal motivations,* focus on enlisting motivation from the learner through "Cooperation, Competition, and Recognition" (Malone & Lepper, 1988, pp. 248-249).

In short, evidence in the research suggested game-based instruction is an effective learning medium (Gagne et al., 1988; Malone & Lepper, 1988; Piaget, 1954; Wallace, 1997). When such theories guide the design of a game structure, learners receive the associated learning benefits (e.g. challenge, control, freedom, satisfaction, and confidence) with increased opportunities to engage in the subject matter (Bixler, 2006). Additionally, according to Van Eck (2005) application of the theories that support different instructional methods allow for better decisions in terms of sorting through and evaluating various games.

Main (1992) provided further guidance on ensuring motivational components (ARCS) are included in the design phase as follows:

- *Attention* gaining strategies and activities should be included early in the instruction and throughout the curriculum to refresh students' interest frequently.
- *Relevant* instructional objectives should also be met early in the course with the help of appropriate strategies and activities and reinforced at every opportunity throughout the instruction.
- *Confidence* - performance objectives relating to expectations of success may be best served by concentrating on the student's past successes.
- *Satisfaction* is derived primarily from achievement, but it is generally thought more motivating if success is determined by self-evaluation than by external assessment. (Main, 1992b, p. 14)

Development

In the development phase, the designer produces and assembles the various content elements conceived in the design phase. Development is described by Morrison

et. al (2001) as an operation of converting the plan constructed in the design phase into instructional activities. They stress the importance of centering the development on the performance goal. Similar to Morrison et. al (2001), Main (1992) encouraged the developer to center strategies, techniques, materials, and media adopted or adapted during this phase on the learner not the subject. Furthermore, to ensure that learners' motivational needs are met at all aspects of development, he recommended that ARCS be incorporated as follows:

- *Attention* of the learner is gained through a variety of techniques used in the media arts. Interest is generated by visuals, auditory messages, motion and color.
- *Relevance* can be addressed in the lesson by using illustrative stories and simulations or exercises with actual equipment.
- *Confidence* may also be built up by a series of increasingly difficult challenges that can be met successfully.
- *Satisfaction* may be generated by competition, peer recognition and self evaluation methods. (Main, 1992b, pp. 14-15)

Implementation

The implementation phase of the IMID model includes making arrangements to deliver the instruction. This means verifying the availability of facilities, instructional materials and equipment. During delivery of instruction, the environment should be maintained and progress assessed (Main, 1992b).

Though Main (1992) does not break down application for each of the four elements of the ARCS model in the implementation phase, it is the belief of this designer that application of *Attention, Relevance, Confidence* and *Satisfaction* are subsumed in a

single statement noted by him. “The implementation phase must generate a climate where the learner feels valued and perceives the mastery of the learning objectives as being important to the learner” (Main, 1992a, p. 18).

Implementation is defined here for understanding this phase in the context of the entire instructional design process. It does not reflect this project’s deliverables, which will be implemented only to the extent of a prototype for formative evaluation.

Evaluation

Research showed that evaluating the effectiveness of the instructional intervention is essential during and after it is developed. The evaluation phase of the IMID model includes measuring achievement in performing learning objectives, evaluating instructor performance, assessing the performance of the course materials and instruction, as well as the function of hardware and software (Main, 1992b).

Formative Evaluation . For this project, the function of evaluation is formative. According to Morrison et al. (2001), formative evaluation is to ensure that the instruction fulfills the objectives through all the stages of instructional design. They also emphasize how conducting early evaluations in the process provide valuable information about the effectiveness of the instructional solution, identify weaknesses, and eliminate wasted time and resources before the process has gone too far (Morrison et al., 2001).

Usability Testing. In the formative evaluation process, usability testing is important to the designer for improving the product outcome and the learning experience. In their book, Managing Multimedia: People and Processes, England and Finney (2002) cited a definition for *usability testing* from the usability.gov website: “Usability is the measure of the quality of a user’s experience when interacting with a product or system—

whether a website, a software application, mobile technology, or any user-operated device" (as cited in England & Finney, 2002, p. 192)

Measuring the Affective Domain . Once developed, it is also important to measure the intervention in terms of goals achieved in the affective domain. Main (1992) and other researchers stated the difficulty in measuring affective aspects (e.g. a learner's motivations) and described it as one of the main reasons that many instructional design methodologies fail to give attention to the affective domain of the learner. He explained that one of the problems is the long period it takes to acquire affective behaviors compared to the short time it takes a learner to receive instruction.

However, even though Main (1992) acknowledged that more research is needed, he believed the following types of measures can be adopted and they are sufficiently accurate to determine if affective or motivational objectives are met:

- *Attention* measurement can include interest shown in continuing to learn about the subject after course is completed.
- *Relevance* can be assessed by questioning how the learner perceived he/she would be able to use the knowledge and skills attained in their job and beyond.
- *Confidence* can be assessed by having the learner perform tasks within the subject domain without assistance and doing a self-evaluation of competence in solving problems.
- *Satisfaction* with the instruction and knowledge and skills learned can be deduced from the successful completion of the course and verified by a questionnaire. (Main, 1992b, p. 16)

According to Dettmer (2006) expressions of affective learning (e.g. stated opinions, beliefs, and sense of self-esteem) may be dealt with through such methods as learner self-evaluations, questionnaires, focus group interviews, and observations (Dettmer, 2006).

Qualitative and Quantitative Data . The development of assessment instruments requires the understanding of specific concepts significant to quantitative and qualitative data. Quantitative data results from an attempt to show the relationship between multiple things in numbers. Using mathematical processes, information is analyzed, measured, and expressed statistically (e.g., in charts and graphs) (Gall, Gall, & Borg, 2005). In contrast, qualitative data results from an attempt to convey the quality of the relationship between multiple things. It is also concerned with understanding the interpretations and meanings given to those things. Qualitative data is more commonly collected by interviews and observations (Denzin & Lincoln, 1998; Gall et al., 2005).

Reliability and Validity . Two concepts help us understand if the data collected is usable, i.e., accurate or can be repeated with similar results. One is the concept of Reliability, which is focused on consistency, precision of the systematic collection of data, and repeatability. Validity is the other concept, which is concerned with the accurate assessment of that which was under examination (Phillips, 1997). In other words, does the data reflect that which was suppose to be measured?

In terms of useful data, the two concepts have a relationship in sociological research according to Livesey (2005). He explained that reliable invalid data may be used only to describe the world in generalities. In contrast, valid unreliable data may be limited in that it can be applied only for understanding some aspect of a thing or group.

To maximize validity and as a result the reliability of data collected, the use of triangulation may be incorporated. Triangulation involves a combination of different methods to analyze or collect data (e.g., one researcher using one or more research techniques) (Golafshani, 2003; Livesey, 2005). Methodological triangulation (e.g. a combination of observation, interviews, and audio recordings) provides for more valid, reliable data (Morrison et al., 2001). This also means collecting and using both quantitative and qualitative data (Gall et al., 2005).

According to Phillips (1997), an instrument for collecting data must measure what it is designed to measure. Mager (1997) elaborated that in order to ensure that this happens, the designer should match the performance stated in every test item according to the same performance stated in the objective.

It is important to ensure that the assessment instrument reflects the content of an instructional program and that the instrument is valid (Phillips, 1997). Hodges (2002) explained *face validity* as the result of the first step in conducting content validation. Face validity has to do with the extent that an instrument appears to measure what it is suppose to (Hodges, 2002). Consistent with Mager (1997), this means that the learning objectives should coincide with the performance objectives; that at least one test item should be developed per objective; and that the amount of test items should represent the importance of each objective as it relates to the overall instructional program (Hodges, 2002).

Assessment Instruments. Because this project involves understanding learners' attitudes, opinions, and feelings about a game-based motivational strategy, it

was important to examine the literature pertaining to instruments recommended for collecting reliable data from the affective domain of the learner.

Researchers agreed that questionnaires and surveys are commonly used instruments for assessing attitudes (Mager, 1997b; Morrison et al., 2001; Phillips, 1997; Rothwell & Kazanas, 1998). Questionnaire instruments may include open-ended questions, which provide more in-depth information about a learner's feelings. Or they may contain closed-ended questions with a set number of responses from which an answer that best reflects the learner's feelings or opinions may be chosen. Because of their objective nature, the closed-ended questions are faster to analyze and more reliable to process. Some combination of both may also be used depending on the time available for tabulation of the replies (Morrison et al., 2001).

Likert-type scales are a modified version of the questionnaire (Morrison et al., 2001). Researchers agreed on not only the validity, but also the reliability of Likert Scales for measuring attitudes and opinions (O'Neal & Chissom, 1993; Robson, 2002). It is a method, developed by Rensis Likert in 1932, by which participants are evaluated using a descriptive scale (e.g. Strongly Agree, Agree, Disagree, Strongly Disagree) based on decisions they make about how strongly they agree with a statement. Each response is assigned a value. By adding the values for each response, a total score for the respondents can be determined (Page-Bucci, 2003).

Another modified questionnaire and frequently employed in assessing affective responses is known as Semantic Differential. According to research, this approach has demonstrated reliability and validity, is cost-effective, and easy to administer (O'Neal & Chissom, 1993; Osgood, Suci, & Tannenbaum, 1967). Semantic

Differential can be administered successfully to individuals with the use of survey interviewers. By asking a person to rate a specific word or concept, this method measures the direction or intensity of the individual's reactions to that word or concept, which is defined by two contrasting adjectives placed at the far left and the far right of a scale. The scale is bipolar with a neutral point usually valued at zero in the center. On either side of the zero is point one, two, and three. The points in one direction may represent a slight intensity while the points moving in the other direction represents an extreme intensity. Additionally, the points in one direction may represent good versus the points representing bad in the other direction. Usually a person is asked to rate one concept on a number of Semantic Differential scales (Osgood et al., 1967).

Rank ordering is another means described in the research for measuring attitudes. It involves measuring an individual's comparison judgments between a set of items (O'Neal & Chissom, 1993). For example, a rank order may be defined as "1, 2, 3 and 4" with "1" being the most favorable and "4" the least favorable. A person asked to rank her favorite beverage from four kinds of beverages, may rank coffee as 1, soda as 2, tea as 3, and alcohol as 4.

Other means valuable to assessing learners' affective responses include observation of behavior and interviews (Mager, 1997b; Morrison et al., 2001; Phillips, 1997; Rothwell & Kazanas, 1998). Researchers are consistent with the idea that attitudes are conveyed in observable behavior (e.g., smiling, nodding in agreement, raising hands, answering questions, etc.) and individuals can be observed as they are engaged in an activity (Mager, 1997b; Morrison et al., 2001). Observation, if appropriately focused, can aid in achieving evaluation objectives that seek in-depth attitude information. Instruments

that help focus the observation can be a simple questionnaire, a rating scale, or an anecdotal record (i.e., open-ended form for writing descriptions and comments) (Morrison et al., 2001).

Researchers believed that conducting interviews, whether structured or unstructured, with an individual or group, allows attitudinal information to be collected as learners discuss their reaction toward the instruction or feelings toward specific ideas (Mager, 1997b; Morrison et al., 2001). Unlike a structured interview, an unstructured one allows for deeper probing. On the other hand, an unstructured interview may be difficult to control and possibly time consuming. Morrison et al. (2001) suggested it can be helpful to tape-record interviews with the permission of the participants.

Even though, assessment of the learners' cognitive domain is not the focus of this project, assessment of learners' recognition of certain facts about the subject matter is addressed primarily for assessing the effectiveness of the product design and function. Therefore, True/False items were examined as one of the most commonly used objective-type test items. Morrison et al. (2001) argued the scope of content that can be tested using true/false questions is limited to factual-type information. Moreover, they asserted that True/False questions are easy to construct, there is a 50/50 chance of guessing correctly, and assessment is limited to lower levels of knowledge acquisition and comprehension (Morrison et al., 2001).

Descriptive and Judgmental Information. There are two types of information provided by formative evaluation. Descriptive information is obtained from formative product evaluation (the evaluation of instructional materials during production) and indicates the value of each instructional component. Likewise, descriptive information is

derived from formative process evaluation (the evaluation of instructional methods) and outlines how learning is delivered (Rothwell & Kazanas, 1998).

Both product and process evaluations provide another type of data; judgmental information. This type of information assesses the learning results and its value when learners are engaged with the instructional materials and instructional methods. Kirkpatrick's (1975) four-level evaluation approach helps the designer determine how to collect information for this purpose. The levels are 1) Reaction, 2) Learning, 3) Behavior, and 4) Results.

Phillips (1997) defined and described how information is collected at each level of Kirkpatrick's four-level evaluation. Level one refers to participants' reactions and thoughts about items, such as the content, materials, the instructor, the instructional delivery, etc. To avoid the influence of a few dissatisfied or satisfied participants, responses about these items are collected on reaction questionnaires (Phillips, 1997).

Level two evaluates the extent to which knowledge and skills have been acquired. Paper-and-pencil tests and simulations for observing performance skills are among several ways to collect level two data (Phillips, 1997).

Behavioral change is the concern of level three and refers to the extent that what has been learned is transferred to improved performance, for example, on the job. Data for level three can be collected from observations performed by participants' superiors and peers, as well as self-assessments (Phillips, 1997).

Level four refers to evaluation of long-term results, i.e. assessing an organization's improvements in operational costs, productivity, and quality of service,

(Phillips, 1997). Collecting data for both, level three and level four were beyond the scope of this project.

Validation/Feedback

According to Main (1992), validation and feedback are means of insuring that attention, relevance, confidence, and satisfaction are considered in each phase of the IMID model and embedded during development. Consistent with other research (Kirkpatrick, 1988; Morrison et al., 2001; Phillips, 1997), he noted that the validation process provides feedback for the designer as a quality check of tasks performed and permits corrections and revisions before time and resources are invested in production and installation where change may be very costly.

Summary

In short, this review provided context for the games used in this project. It identified the characteristics and classifications of games, introduced gaming trends, and offered evidence on the benefits of game-based learning. Research about the learner's affective domain, attitudes, and motivation factors were considered in light of game-based instruction for the adult learner. The next Chapter presents a detailed account of the systematic approach used in all phases of the instructional design process to meet the goals of the overall project.

CHAPTER III

METHODOLOGY

The Methodology design for this project is based on Main's (1992) Integrated Motivation Instructional Design (IMID) Model described in Chapter II. As mentioned, it is an appropriate model because of its inherent motivation guideposts, which allow the designer to consider motivational aspects of learning during all phases of the project's design and development activities. Additionally, with its provisions for continuous feedback and formative evaluation, the model guides the development of assessment instruments ensuring their validity and reliability for evaluation of the intervention and their efficiency in collection of data from the affective, cognitive, and psychomotor domains of learners.

Each phase follows with a list of tasks conducted by the designer and recommended by Main (1992) to maintain focus on the motivational needs of the learner and for the purpose of establishing and accomplishing the goals of this project.

Analysis

The project was initiated with a meeting between this designer and Subject Matter Expert (SME) Benoit (course instructor) to define and determine how to address a problem in the *History 28: Women in American History* (WIAH) course offered at Butte Community College in Oroville, California.

The first thing that was identified was a *felt* need, which is defined in the research as “an individual’s desire or want to improve either his or her performance or that of the target audience” (Morrison et al., 2001). In this case, Benoit focused on improving the performance of the target audience (her students). Benoit felt that unlike in her classroom, students were not motivated when they worked in the online component of the course. She had come to this conclusion based on her own observations of student activity when they logged into their WebCT (Web Course Tools) accounts to do required assignments. From the lack of in-depth responses to questions submitted with the online assignments, she determined that most students were not reading or researching sufficiently, nor were they providing answers that indicated they were synthesizing the information presented online and the information presented in the classroom.

To address the lack of motivation, Benoit proposed the idea of adding game activities to the online component of the course but was not sure the best way to go about it. She expressed that she was seeking ways to encourage appreciation for WIAH by engaging students longer with the subject. She wanted to provide students an interesting online experience, which was different from the classroom approach to learning about the subject matter. Moreover, she wanted to provide students a means to assess their own knowledge about the subject and prepare for course quizzes and exams, and ultimately to create a positive experience for students with the hope that it would encourage lifelong learning pertaining to Women in American History (personal communication, T. Benoit, March 2005).

Benoit perceived some form of interactivity as beneficial to student motivation. Even though it may have been apparent to Benoit that the efforts of students

working in the online environment was less than their efforts demonstrated in the classroom, it was important for the designer to analyze those factors to determine whether or not a game-based intervention would reduce students' *performance deficiency* online. The four tasks outlined in the Analysis phase of the IMID model was used for this purpose (see Figure 2).

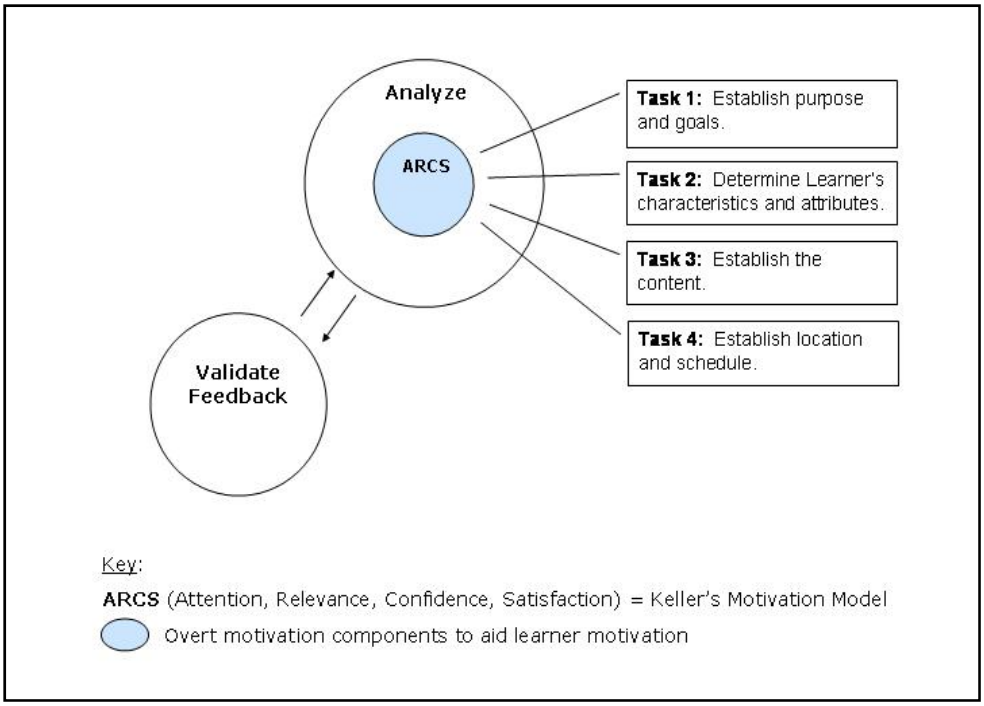

Figure 2: Analysis Phase

Task 1: Needs Analysis - establish purpose and goals of the game-based intervention

To establish why a game-based intervention would be needed, the designer analyzed the source of the problem posing questions to discern if the problem stemmed from the cognitive, psychomotor, or affective domains (Main, 1992b). Were students' performance deficiencies due to lack of knowledge, skills, or feedback?

In answer to this question, Benoit reported that most students showed an interest in acquiring knowledge about the Women in American History subject matter when in the classroom. They participated in class assignments, group work, and discussions, which included peer and instructor feedback, demonstrating fairly high levels of comprehension of the content. Students had been oriented on how to login and use the WebCT learning environment early in the course so that any discrepancy in online skills were addressed; however, from the low-level quality of writing posted in the WebCT discussion area, Benoit discerned there was a lack of in-depth reading and research from these same students when online. Even though a discussion board (WebCT tool for posting peer assignments and feedback) was being used and many resourceful links to media-rich content on the course subject were provided, students submitted online assignments barely above the level required to pass the class, not necessarily because they were motivated to explore the subject matter further (Benoit, 2005).

Based on Benoit's observations, there was acceptable student performance in the classroom in which the students demonstrated necessary knowledge about the subject, exhibited sufficient reading skills, and expressed no lack of feedback in order to meet the requirements of the course. The designer then analyzed student ability.

Could the students do the necessary work online to acquire the knowledge about the subject if their lives depended on it? (Mager, 1997c). In answer to this question, Benoit reported that students demonstrated that they could in the classroom, and to a lesser degree, they showed ability online, but students' overall efforts online were poor in comparison. According to Mager (1997), if the answer to the question is yes and a performance problem still exists, then the problem stems from the affective domain.

Thus, after it was determined from Benoit's observations that students had done some of the online assignments as required, suggesting ability was not an issue for students; the designer decided the performance problem online to be motivational in nature. Before learners can benefit from the instruction, they need to be motivated to learn (Morrison et al., 2001).

As noted in Chapter II, motivation is a component of the affective domain of learning and closely tied to the attitudes of the learner. To affect change in the attitudes of Benoit's students, the affective components of Benoit's proposed game ideas were analyzed next based on Keller's (1987) ARCS principles. According to Main (1992), it is important to address affective components early in the instructional design process and as suggested by him; the designer assessed what the learner would value in terms of game-based learning outcomes. These values are supported from research conducted in the Literature Review and are briefly noted in the following paragraphs.

Improving learner confidence is one value of games (de Freitas et al., 2006). According to Main (1992), confidence fosters a positive learning experience, which increases motivation and in turn improves self-efficacy to reach learning goals (Main, 1992b).

Relevance to the learner is yet another value of games. Games can provide immediate application of knowledge and skills as well as providing learners with feeling in control of the learning process (Stolovitch & Thiagarajan, 1980), which according to Main (1992) are important relevant factors from the learner's perspective. Relevance results from not only what content is delivered, but also from how content is delivered (Keller, 1987). For example, in contrast to traditional delivery of content by lecture,

Stolovitch and Thiagarajan (1980) asserted, time-tested games that are familiar, such as Tic Tac Toe or a matching game like Concentration, not only relate to the learner by stimulating prior knowledge and skills, they also engage learners in novel, collaborative, fun, and challenging ways that improve motivation. Furthermore, games can be designed to allow learners to self-assess their own learning, which according to Main (1992) is more motivating.

Malone and Lepper (1988) alluded to the idea that recognition of achievement, though extrinsic motivation, is a value that learners can appreciate as part of game activities. Learner's achievement should be made available to other people, so that the need for recognition in the individual is satisfied (Malone & Lepper, 1988).

It is this designer's belief, in light of the research, that the addition of the aforementioned values associated with games may be beneficial to adult learners who experience motivational barriers in the online learning environment. Bixler (2006) asserted online learners face motivational barriers (e.g. isolation, frustration, and academic persistence as discussed in the Literature Review), and therefore motivational aspects of online instruction should be improved.

In conclusion, this first task considers Bixler's (2006) online motivational barriers and students' online performance among other findings gathered from Benoit's interview. Based on the information, the designer and subject matter expert established that the purpose of the game-based intervention would be to increase student motivation in the online learning environment by addressing the values of games with the following goals:

1. to decrease frustration by increasing self-confidence through learner achievement of challenging game objectives (e.g. level 1-least challenging to level 3-most challenging),

2. to improve academic persistence by providing learner relevance using a just-in-time approach to the subject while online (e.g. games as assessment tools to help prepare for course quizzes and exams, in addition to students' other study methods),

3. to decrease feelings of isolation by providing opportunities for student collaboration when developing content for the games and for personal satisfaction through recognition of each group's achievement.

Task 2: Learner Analysis - determine learner characteristics for game-based intervention

To more specifically analyze the target audience for the game-based intervention, the designer posed questions about the learner as recommended by Main (1992).

What are the demographics of the learner? In order to participate in a game-based intervention, what are the learners' knowledge prerequisites? Answers for these questions were derived from three sources. First, information was gathered from the interview with Benoit, in which she described that the learners are comprised of adult students enrolled in the WIAH course, most of who are women between 18 and 24 years old. Benoit also noted that students need to be familiar with the material presented in the classroom in order to interact appropriately with game content, which would focus on the same WIAH subject matter. Second, the designer personally observed students (designer sat in on three different WIAH classes taught by Benoit, one of which included students

participating in a game activity in the classroom). Third, the information obtained from research discussed in Chapter II describes other characteristics about Benoit's students, which help explain their motivations for playing games. Essentially, they represent the population of game players who play casual online games.

To review briefly, casual online games are less complex in terms of game design and effort needed to understand how to play (e.g. digital Puzzle, Word, and Card & Board games) (International Game Developers Association, 2006).

Task 3: Content Analysis - establish the content of the game-based intervention

Since content of the game-based intervention would be based on the same subject matter presented in the classroom, the designer first analyzed the existing course goal and objectives developed by Benoit. This was done also to determine the desired knowledge, skills, and attitudes (Main, 1992b).

The WIAH course examines the "roles women have played in the history of the United States from pre-colonial times to the present . . . contributions to the economic, social, cultural, and political development of the United States including interactions of gender with race, ethnicity, and class" (Benoit, 2005).

The course content pivots around four main objectives. First, identify individual women who have uniquely contributed to the development of American society. Second, recognize the changing societal assumptions and expectations regarding the roles women play in family life and the society. Third, recognize the intersection of gender issues with those related to race, ethnicity, and class. Fourth, evaluate the major issues of the women's rights movement in the past, present, and future (Benoit, 2005).

The game-based intervention would serve as a motivational support with the goal of delivering course content in more interesting and engaging ways when students worked online. Next, since it was not intended to replace the existing content, Benoit decided that important facts and events associated with specific women featured in the class lectures, should comprise the knowledge content of the game activities.

Task 4: Context Analysis - establish location and schedule of game-based intervention

During the interview with Benoit, the designer determined where and when the game-based intervention would be used.

WIAH is delivered as a hybrid class and requires students to attend a live class (two hours) and work online (one hour) for a total of three hours of class time per week. Students are expected to do independent reading tasks outside of the classroom in addition to locating and using resources online to complete course assignments. Additionally, the course is supported with WebCT, a web-based course management system that allows the instructor to customize the course curriculum. Students have access to items such as, readings, research assignments, and quizzes posted by the instructor as well as links to other web-based resources.

The designer determined that the game activities should be in digital formats to facilitate integration in an existing WIAH website utilized by the instructor and linked to the WebCT environment. Students would have access to the games by logging into their WebCT accounts at any time and from any computer (e.g. school or home).

Analysis Phase - Conclusions

Based on the findings in the Analysis phase, the designer confirmed with the subject matter expert that the problem identified was a lack of student motivation in the online component of the WIAH course. With the purpose to improve the situation, it was decided that a motivational strategy; a prototype be designed and developed to complement existing course instruction as established in the first task of this phase. It includes the goals of decreasing online motivational barriers through student attention, confidence, relevance, and satisfaction. Two parts, derived from the goals, comprise the motivational strategy: 1) students engaged in playing a number of different games online about Women in American History, and 2) students collaborating on the development of content for the games.

Design

On several occasions the designer discussed with the SME design details of the game-based motivational strategy. The six tasks outlined in the Design phase of the IMID model were used to guide this process (see Figure 3).

Task 1: Specify performance objectives

First, because it is difficult to measure the overall goal of the game-based motivational strategy (i.e., improve student motivation online), it was important to identify specifically the desired student performance in terms of attitudes, knowledge, and behavior. This was accomplished by creating performance objectives.

The existing WIAH course objectives addressed primarily the cognitive domain of the learner, which focused on increasing learner knowledge of the subject

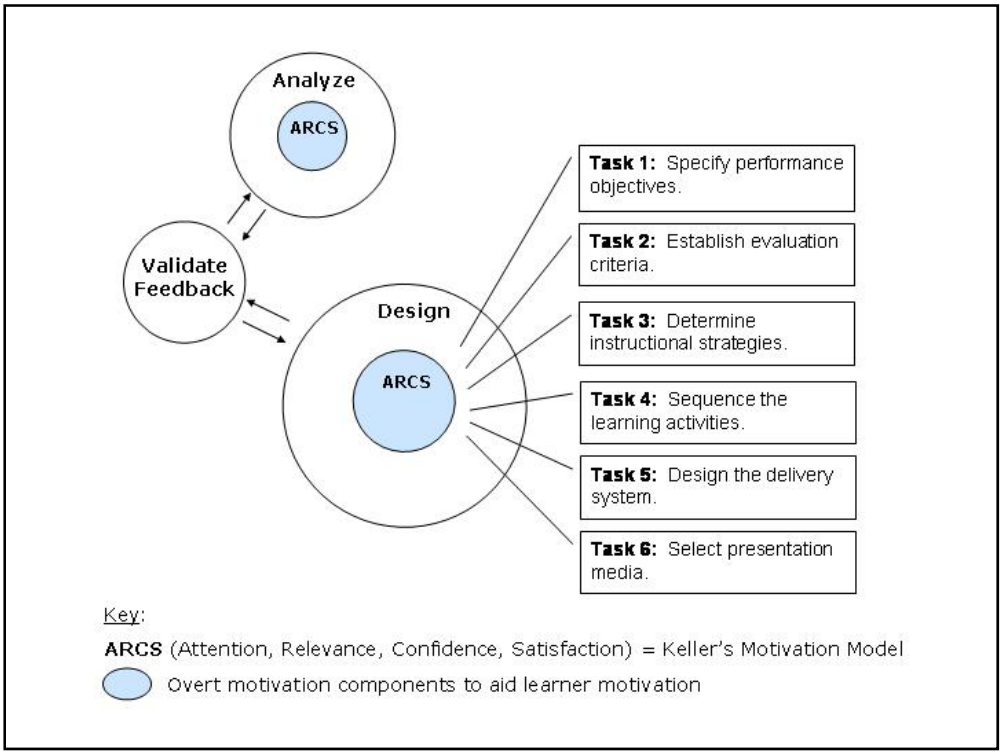

Figure 3: Design Phase

matter. However, since the need identified was specifically concerned with learners' motivation while online, it was important that the design of the game-based motivational strategy subsume the established course objectives, but also include objectives that focused more on the affective domain of the learners.

To support Benoit's existing course objectives, the designer developed seven affective performance objectives and one cognitive performance objective representing the following themes derived from data collected in the Analysis phase.

Seven Themes for Affective Domain

Student attitudes about:

1. online learning
2. whether playing games engage them longer with the subject

3. design and function of the games
4. the games as course subject assessment tools to prepare for quizzes and exams
5. other ways they prepare for quizzes and exams
6. game content development tasks
7. perceived knowledge of the games' content

One Theme for Cognitive Domain

Student achievement of the actual knowledge of the games' content was the theme represented by one cognitive objective.

Task 2: Establish Evaluation Criteria

Review of the literature revealed the importance of providing criteria by which each performance objective may be measured (Mager, 1997c; Main, 1992b; Morrison et al., 2001; Rothwell & Kazanas, 1998). See Tables 1 and 2 in Appendix A for the conditions, standards, and measurement devices of each objective. Explanations for the different measurements used are in the Evaluation phase.

Task 3: Determine Instructional Strategies

Research suggested the amount of 'effort' exerted toward learning can be an indication of a learner's level of motivation (Paras & Bizzocchi, 2005). Small (1997) implied that effort can be measured and serves as a chief informant for a learner's level of motivation. She expounded that what is to be learned must be appreciated by the students and the students must have every confidence that they can achieve it prior to putting forth any energy (Small, 1997). It is the belief of this designer that Small's view implies that the game-based motivational strategy must comprise instructional strategies that are

meaningful and presented in a way that engages the student, thereby promoting favorable assumptions in the learner that performance objectives can be attained.

To assist with a meaningful experience for the learner, the game-based motivational strategy developed for this project is built on a foundation of blended learning theories supported by research presented in the literature review. Figure 4 shows four learning theories with the learner at the center.

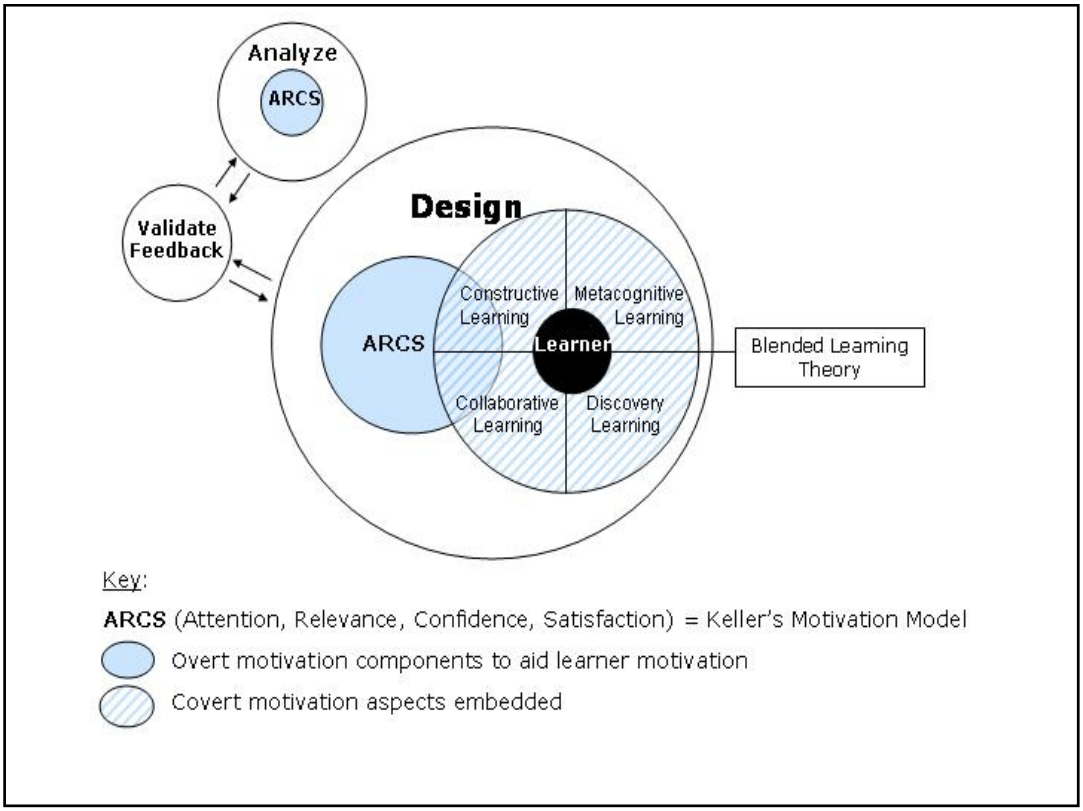

Figure 4: Blended Learning Approach

The game playing component of the motivational strategy is based on the Constructive and Metacognitive theories.

This designer agrees with other researchers that building single player games on constructivist and metacognitive principles provides opportunities of motivation for learning because it puts the learner in control of his or her learning experience (Stolovitch & Thiagarajan, 1980); a motivating factor. It is also this designer's belief that integrating elements that comprise *casual games* into the design of a game-based intervention is keeping in line with the game trends presented in the Literature Review, which suggested games lend to stress reduction—another motivating factor associated with this target audience.

From content associated with the existing cognitive objectives of the WIAH Course, the designer derived definitions, facts, and concepts, which describe the type of learning that students would be engaged in when playing the games. According to Rothwell and Kazanas (1998) such information should be fitted into a strategy (e.g., patterns or mnemonics) that is meaningful to the learner (Rothwell & Kazanas, 1998).

Since framegames allow for the construction of relationship patterns and chunking or grouping of content in a way that improves retention and is meaningful to the learner (Stolovitch & Thiagarajan, 1980), the designer and SME chose four framegame tactics for this purpose: 1) Tic-Tac-Toe, 2) Matching, 3) Ranking Order, and 4) Short-Answer.

In Figure 5, the designer uses content from the WIAH course to show three examples of relationship patterns, which are inherent in the designs of the four framegame approaches. The cause-effect relationship is used in the matching-based game, the sequence relationship is used in the ranking order-based game, and both Tic-Tac-Toe and Short Answer-based games use an association relationship pattern.

As mentioned previously, framegames comprise the first part of the motivation strategy to be used in the online context of this project. Additionally, these digitized framegames contain elements of the hide-the-guide approach (e.g. rules and answer hints) (Wallace, 1997) which serve as hidden guides and are accessible at the learner's own discretion; providing a level of control.

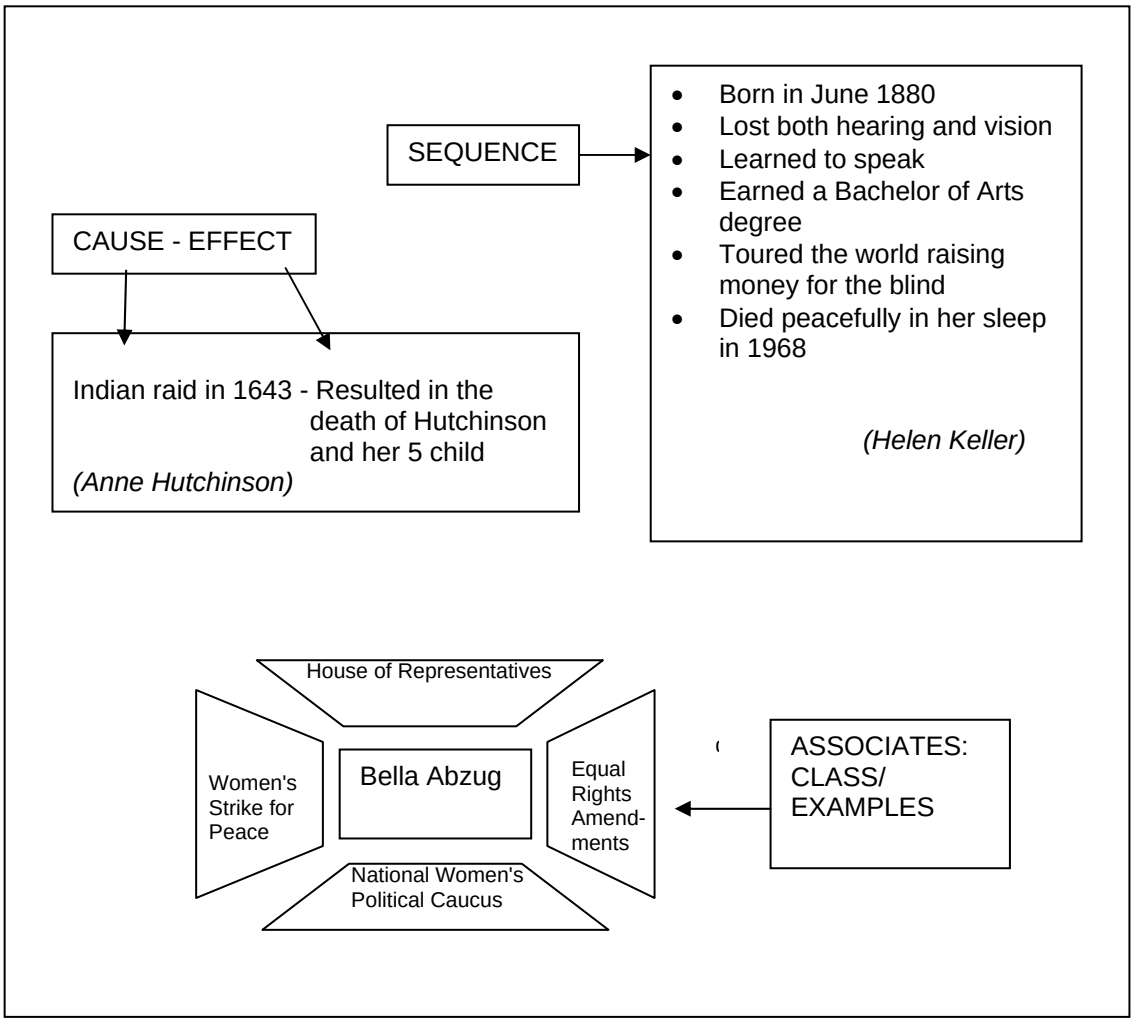

Figure 5: Relationship Patterns in WIAH subject matter used in Framegames.

Robert Gagne's (1992) Events of Instruction were used in the design process to assess the four game tactics for the instructional strategies they embodied (see Figure 6). In Appendix A, see Table 3 for the framegames' built-in instructional strategies that correlate to Gagne's Nine Events of Instruction.

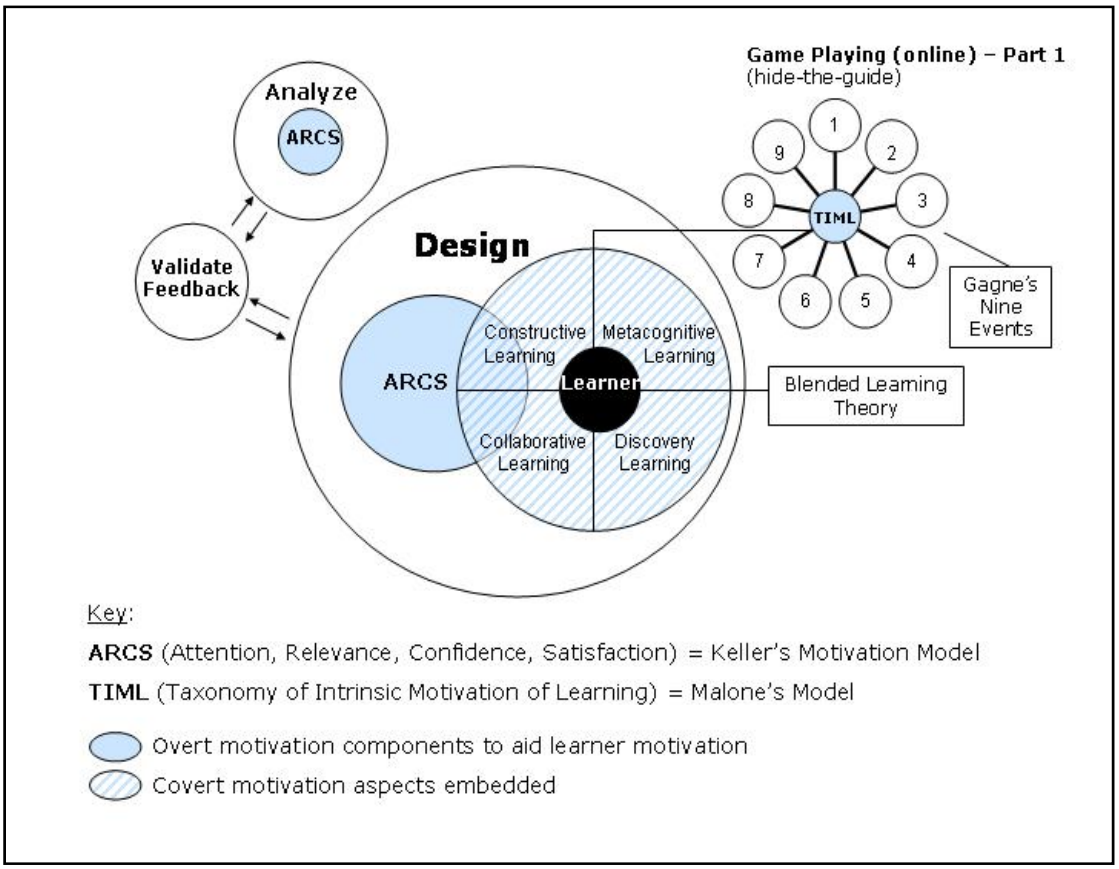

Figure 6: Part 1 - Game-based Motivation Strategy

The designer expanded the strategy to include a game content development activity (see Figure 7) conducted offline in an attempt to address learners' intrinsic motivation needs and foster a deeper understanding of the subject matter (Malone &

Lepper, 1988). The game content development component of the motivation strategy is based on the two other learning theories, Collaboration and Discovery.

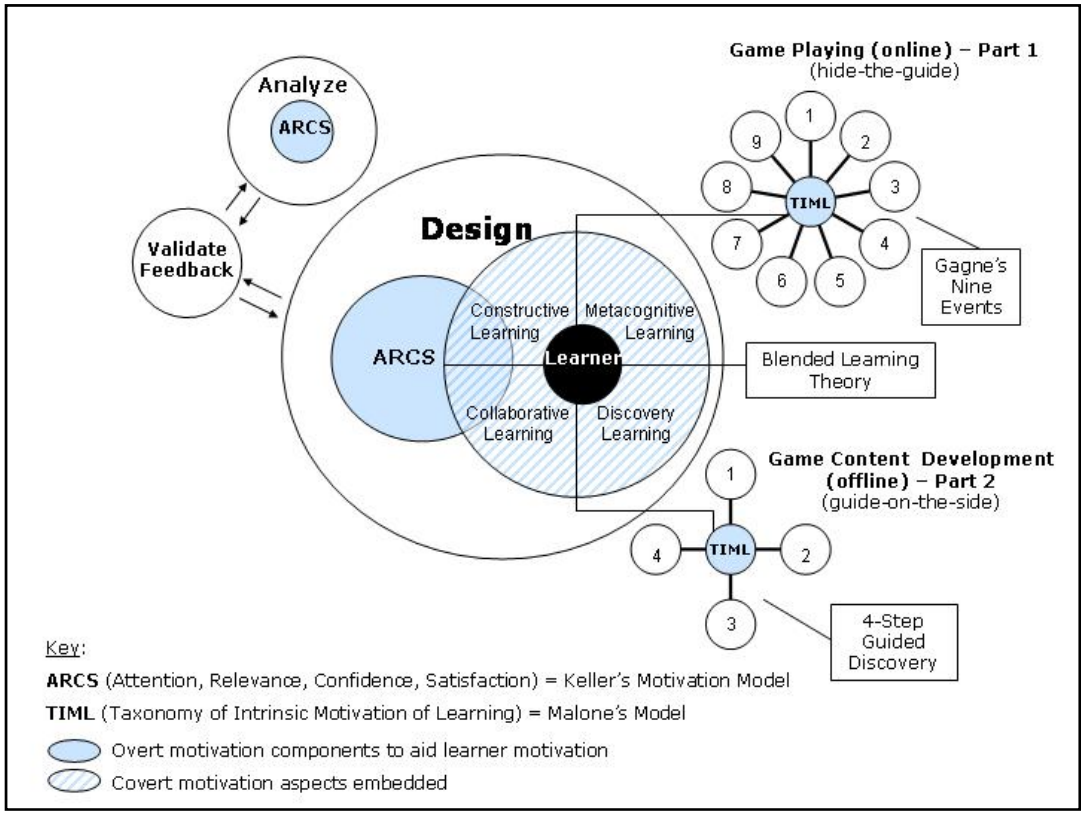

Figure 7: Part 2 - Game-based Motivation Strategy

Consistent with the aforementioned research, it is this designer's belief that including a game-associated activity based on collaborative and discovery principles provide opportunities of motivation for learning through peer interaction, wherein the learner gets multiple perspectives on a topic from group members and is drawn into a more intimate level with the subject matter (Summers et al, 2005). Another opportunity of motivation for learning comes from the learners' reflections on their own personal strategies (Bruner, 1966) that are used to achieve performance objectives.

After examining the affective performance objectives for the project, the designer determined that the learning for this second component should be concerned with influencing student attitudes about the WIAH subject matter. According to Rothwell and Kazanas (1998), one way to meet such learning outcomes that involve attitude change is through guided discovery (Rothwell & Kazanas, 1998). They explain that this kind of learning is personal for the learner, who relies on her/his insights and internalized experiences to learn.

The guided discovery approach is used to help avoid potential misconceptions and the creation of cognitive overload. For example, an overload may be the result when a learner is given an unguided discovery learning situation while also immersed in a multimedia environment with high levels of flexibility and control (Clark & Feldon, 2005).

The game content development activity is the second part of the motivation strategy and embodies elements of the guide-on-the-side approach (Wallace, 1997), the purpose of which according to Wallace's matrix, is to influence attitude and behavior, include two-way communication, and hands-on activities. These factors are consistent with discovery instructional methods referred to by Romiszowski (1981) and Bruner (1979) in the Literature Review.

Romiszowski's (1981) four-step process (as cited in Rothwell & Kazanas, 1998) aided the designer in constructing the game content development component as a guided discovery strategy. See Appendix A, Table 4, which shows the instructor's performance tasks that guide students in the collaborative effort of developing content for the games.

Note that Figure 7 also indicates Malone's and Lepper's (1988) Taxonomy of Intrinsic Motivations for Learning (TIML) in the online and offline components of the game-based strategy.

In his comparison, Bixler (2006) found that TIML was an overt motivational-based model like Keller's ARCS model. As discussed in the Literature Review, the second part of TIML labeled *Interpersonal Motivations* includes competition, cooperation, and recognition that aid in motivating the learner.

The competition element in the game playing part of the motivation strategy involves the learner playing not only against the clock, but also against her or his own self (i.e., personal skills and scores). The cooperative element in the game content development part of the motivation strategy involves group activities where all students have opportunities to achieve the same objective of developing questions according to the structure of the game templates, and the instructor's criteria or guidelines. Based on Malone and Lepper's (1988) suggestion that a learner's achievement be made available to other people, the designer and SME decided the recognition need be satisfied by publishing each group's photo and games on the existing course website for future WIAH classes to see and play.

Furthermore, the game-based motivation strategy combines two factors that are important to the affective domain: 1) learner participation and 2) just-in-time education (Main, 1992b). As for learner participation, the primary activity is interaction with game events as learners navigate during play. The designer and SME chose to design the tasks of the game-content development as group activities from the outset to provide another means for learner participation. As for just-in-time learning, the games,

which main purpose is to deliver instruction, is presented online as assessment tools for learners to assess their own knowledge retention. Therefore, the games serve as instruction and assessment on demand; they provide learners an opportunity to acquire knowledge at their own pace and to prepare for exams.

In short, Task 3 involved a blended approach that helped the designer establish the two main instructional components that comprise the overall Game-based Motivation Strategy.

Task 4: Sequence the Learning Activities

Sequencing the two components of the game-based motivation strategy is important to the success of the project. Both parts contain learning activities that are linked to the course content and the learner (Main, 1992b). In terms of sequencing, the designer and SME decided to place the games on an existing course website, which learners could access anytime. The setup would allow learners to control the sequence of which game to play first.

Research suggests that content be sequenced from simple to complex (Morrison et al., 2001). The designer chose to begin with the game-playing component because the content to be learned is factual, whereas the game content development component moves the learning into concept formation and higher order thinking skills.

While sequencing the game-based motivation strategy, the designer also kept focused on the affective domain. The following paragraphs describe how ARCS is built into the decided sequence.

Attention. Students play games choosing from among several types. The variety provides change and serves as a stimulus to capture learners' *attention*. Learners are asked to work in groups, which due to the different perspectives about the subject matter, also help maintain learner interest.

Relevance. After playing the games online for a few weeks, students are introduced to game-content development tasks, which consist of researching and developing question items for new games as well as reviewing content of their peer's games. This activity is *relevant* to the learners since after a few weeks of game playing they become familiar with the course content and how each game type presents specific kinds of knowledge about the subject matter.

Confidence. Once learners develop their own content for games, they are encouraged to play their own and their classmates' games. Learners' interaction with and successful accomplishment of three different levels of play, from easy to more difficult in each game, also builds their *confidence* in learning the subject matter.

Satisfaction. It is the belief of this designer that when learners play the games they contribute to, their interest is rejuvenated and there is a level of student ownership and *satisfaction* tied to the end product.

Task 5: Design the delivery system

An important part of instructional design is determining the design of how instruction is to be delivered. The designer made the delivery system selection based on students' learning situations (Rothwell & Kazanas, 1998). Because learners are required to spend time mostly alone in an online learning environment, the decided mode of delivery for the game-playing component was individual instruction in the form of single

player games. This mode allows control for the learner and promotes learner interaction with the instructional process in a novel, interesting way; all of which are important factors in designing for the affective learning domain.

Evidence showed that one of the best ways to address affective objectives is also through collaborative activities (Iverson & Colky, 2004; Poindexter, 2003). After discussion with the SME, it was determined the best method of delivery for the game content development component of the motivational strategy was group instruction. It would allow learners to increase their motivation, learn by being engaged with the subject matter through different peer perspectives, and develop new ways of understanding the material as they share and evaluate one another's opinions and discoveries.

Task 6: Select presentation media

Given that learning for this project took place in a hybrid (online and classroom) environment, the designer gave careful attention to the benefits of the medium (games) and its relationship to course content and the learner's needs (Berge, 2002). According to Ely (1999), the digital games designed to deliver the instruction in this project are the instructional technology (multimedia tools) used to enhance instruction and not meant to replace it.

Therefore, the designer analyzed appropriate software that would generate games that would best deliver the content and would allow for easy update and maintenance by the instructor. It was important that it also met the needs of the project while remaining in the budget and time constraints noted in the Introduction. For these reasons, and others discussed in the Literature Review, the designer chose Carson Media eGames Generator online software to generate the games. Considerations for the affective

domain were apparent in the Carson Media eGames. They demonstrated capacity to stimulate active participation from the learner, to arouse attention, to adapt to learners' individual learning aptitudes, and to enhance the subject matter; all important to selecting media (Main, 1992a).

Given that the learners were not taking the WIAH course to learn about game design and development, the designer sought a way to create an engaging online learning environment for students without it distracting from existing overall course activities and the instructor's timeframe to deliver required history lessons. Furthermore, the designer attempted to seek less moving parts in the game creation process, to increase efficiency in delivery. Carson Media offered game templates based on the tactics and framegame relationship patterns discussed in Task 3 as well as an easy-to-follow data entry process to ensure the games could be developed and reproduced quickly.

Design Phase - Conclusions

Based on the learning theories presented, instructional strategies established in the Design phase, as well as several discussions with the SME regarding the instructor's and learners' needs, the designer confirmed with the SME the design blueprint for the game-based motivational strategy. Table 5 in Appendix A was the design document used in the next phase to guide the creation of components while maintaining focus on the project's objectives.

Development

Components of the Game-based Motivational Strategy were created in the Development phase (see Figure 8).

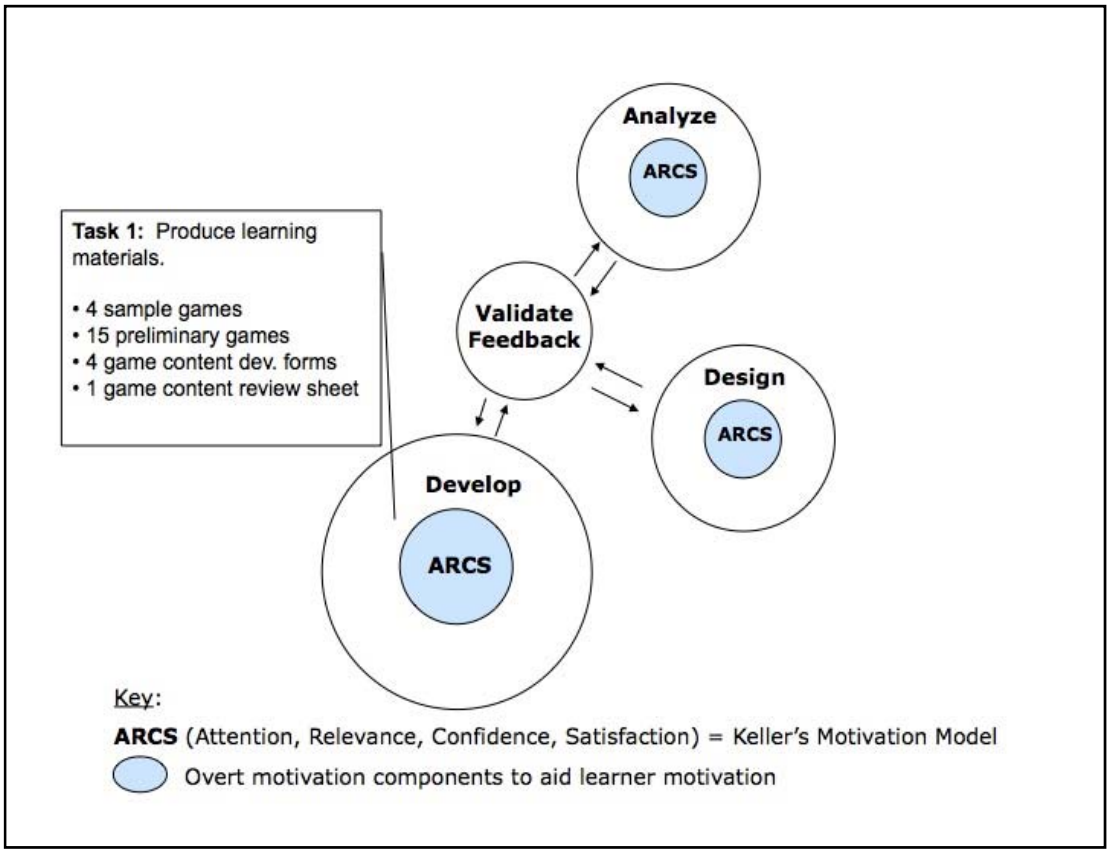

Figure 8: Development Phase

Task 1: Produce learning materials

The two major instructional strategies that make up the game-based motivational strategy (i.e., game-playing and game content development) require two areas of production: 1) games and 2) game content development forms and content review sheet.

Before production began, the designer became familiar with the eGames Generator and the different game templates offered on Carson Media's website. Then the designer registered for a free account with the login and password made available also to the WIAH instructor. Focusing on the affective domain of the project's target audience

and matching the game tactics discussed in the Design phase, the designer chose four game templates labeled *Pop It!*, *Connect It!*, *Pair It!*, and *Order It!*

The templates met four important game elements (Stolovitch & Thiagarajan, 1980) discussed in Chapter II. Each game's objective is that the player completes the game before time runs out. The built-in timer counts down remaining seconds and provides the element of *conflict* as the user competes with the computer. Each game has a rule that indicates how the game ends. For example, the *Pair It!* game requires the user to click on a pair of related statements displayed on the game board. If the number of pairs matched are 15 out of 20 before time runs out, then the user wins and the element of *closure* is fulfilled. *Contrivance* is also built into the games with each game projecting a random display of items every time the game is replayed, and with less time provided to complete the game at both levels two and three.

Sound effects to alert the player to correct and incorrect answers are built into both the *Pop It!* and *Pair It!* game templates. However, even if the games are played without hearing the sounds, all the templates have visual cues that serve the same purpose. For example, when responses are correct in the game *Pair It!* colors of the boxes containing the corresponding statement change from light blue to dark blue. When responses are incorrect, colors of the boxes change from light blue to red.

The Carson Media website provides a description on how each game is played. Brief statements follow about the four games the designer selected:

1. In *Pop It!* the player sees a 3 X 3 grid with items randomly located in five of the boxes. Below the grid, the player will see an answer slot with a blinking cursor. The computer displays several items, five at a time. The player's task is to rapidly and

correctly type responses to each item (question) that display in tiles on the game board until they have provided a specific number of correct items (Carson, 2006).

2. In *Connect It!* the player sees a 3 X 3 grid with question categories in each of nine boxes. To the right side of the grid there are spaces for questions and answers. The computer displays question categories in each box. The player chooses a category of knowledge and then types a short answer to a question about that category of knowledge. With correct answers the player receives an "X" and gains points, with incorrect answers the player receives an "O" and looses points. The player's task is to correctly answer questions in any three boxes in a straight line (Carson, 2006).

3. In *Pair It!* the player sees a 4 X 3 grid with several tiles containing text. Each tile has a matching tile placed at random locations on the grid. The player identifies pairs of related items and the task is to pair up the tiles correctly (Carson, 2006).

4. In *Order It!* the player sees that numbers are displayed in order on the left margin of the game board. The computer displays several items to the right of each number. These items are arranged in a random order. The player's task is to rearrange these items in the correct order before the timer counts down to zero (Carson, 2006).

The designer produced four sample games, fifteen preliminary games, four game content development forms, and a game content review sheet as described in the following paragraphs.

Four Sample Games**.** First the designer worked with the SME developing questions and answers about a Native American woman named Wilma Mankiller, who was one of the primary women studied in the WIAH classes. After sixty-seven question

and answer items were developed about Mankiller, the designer created four sample games, one based on each of the four game templates.

Three main steps were involved to create the games using the generator: 1) set your eGame properties, 2) Add items (and categories for *Connect It!*), and 3) Publish your eGame.

For each game, the designer filled in required information at each step including a custom name, the number of items to display at a given time during game play, the time limit (in seconds) for three different levels, and twenty (seven for *Order It!*) items (i.e., questions with corresponding answers).

Each template includes elements that aid engagement and control for learner motivation (Berge, 2002; Bixler, 2006), such as a help button, control buttons (play, pause, and stop), three buttons for three different levels of challenge, a count-down timer, and a score box. All the templates include feedback components (color changes and animation or sound effects) so that learners will know if the choices they select while playing are wrong or right.

To guide the player, the designer chose the option to include detailed help files for navigating the play and rules. Since rules of the game are the first things shown on the game board when the game is launched, the designer later made a point to add students' source citations for their game content in that same area of the board. The generator offered a variety of skins, which are enhancements designed to change the look of the game's interface. The designer had the option to choose trial skins first until satisfied with the games. Upon publishing each game, the designer had the option to select from a choice of non-trial skin colors (e.g., white with blue skins) that matched

colors of the existing website where all games were eventually uploaded. To provide the instructor in the future with the option to use a Learning Management System (LMS) so that game scores can be tracked and monitored by the instructor to help improve student performance, the designer chose the option in the generator that enabled the feature "to send results to LMS for every game."

See Samples 1, 2, 3, and 4 in Appendix B to view screen captures of web pages containing the four Mankiller games.

Fifteen Preliminary Games. Second, after collaboration with the SME, eight other women featured in the WIAH course materials were chosen. Benoit compiled game content by having one of her other WIAH classes develop questions with answers for each woman. The class was divided into groups of three to five individuals. They were composed of students representing the same target audience used in this project. The four sample games were used to show students the type of games that the questions and answers would be designed for.

After researching the following eight women: 1) Bella Abzug, 2) Fannie Lou Hamer, 3) Rachel Carson, 4) Eleanor Roosevelt, 5) Alice Paul, 6) Pocahontas, 7) Anna Howard Shaw, and 8) Harriet Tubman, the students developed 259 questions and corresponding answers, which comprised content for fifteen preliminary games: *Pop It!* (7), *Connect It!* (3), *Pair It!* (3), and *Order It!* (2).

Four Game Content Development Forms . Third, to aid in the collection of the content (questions and answers), the designer developed Game Content Development Forms based on data input guidelines in the eGame generator. A form for each of the four game templates was designed in Microsoft Excel.

After some research, individual members of each group were then responsible for developing content for one game and were free to choose any of the four game types. Each student was asked to write twenty questions with answers about the featured woman assigned to her/his group and transfer the information onto the game content development form corresponding to the game type she/he had selected.

Taking into consideration interpersonal motivations (Lepper & Malone, 1987), students were told that their question items would be integrated into games similar to the sample Mankiller games and that they would be recognized for their efforts on a Woman In American History website accessed by students from other WIAH classes at the college. Benoit took photos of each group and told them that the final version of their games would be uploaded to the website with a photo of their group and names identifying them as content authors. For this purpose, the designer developed a form to record photos taken of each group, names of all group members, and the titles of games authored by each member of the group. To view the form entitled *Group Photos and Game Record*, see Appendix C.

After editing the students' completed Game Content Development Forms, Benoit provided the designer with the completed forms.

Game Content Review Sheet. The designer developed a game content review sheet for aiding students in reviewing the game content of their own games and the games of other members of their group. The sheet was designed with two parts to facilitate the process.

Part 1-*Your Game Review* involves reviewing the Print Copy of the game content (questions and answers) and reviewing the trial versions of the games; namely

content (i.e., title and source citations) displayed on the opening screens of the game. Part 2-*Your Group Member Game Review* involves each student reviewing games of another group member by playing her/his game and writing comments about it on the content review sheet.

The first part also facilitates the collection of information from the students and instructor to help the designer verify spelling, grammar, punctuation, and continuity between questions and answers before publishing final versions of the games. Additionally, the second part allows group members to reflect on a different perspective about the woman assigned to their group. By playing the games of other group members, each student is exposed to another set of questions about the featured woman. Answers are learned through game play, thereby reinforcing some of the subject matter. The designer added two closed-ended (yes or no) questions to help students quickly assess whether or not a fellow group member's game(s) were based on information studied in class or researched according to the instructor's guidelines.

Appendix C contains a sample of a Print Copy, which the designer chose to export with each game from the eGame generator to assist students in reviewing content of their own games.

Development Phase - Conclusions

As recommended by Main (1992), ARCS was addressed during development by creating a variety of games with changes in visuals, sound effects, color and motion for attracting and maintaining students' attention. Relevance was factored in by presenting familiar game formats in the learning environment. The games fostered confidence in students through student achievement of increasingly challenging levels of

play. Finally, student satisfaction was generated through peer recognition of students' efforts in the game content development activity.

Formative evaluation (usability testing) of learning components created in the Design phase is described in the Evaluation section.

Implementation

The prototype of the Game-based Motivational Strategy created in the Development phase was implemented to the extent needed for the designer to conduct a formative evaluation (see Figure 9).

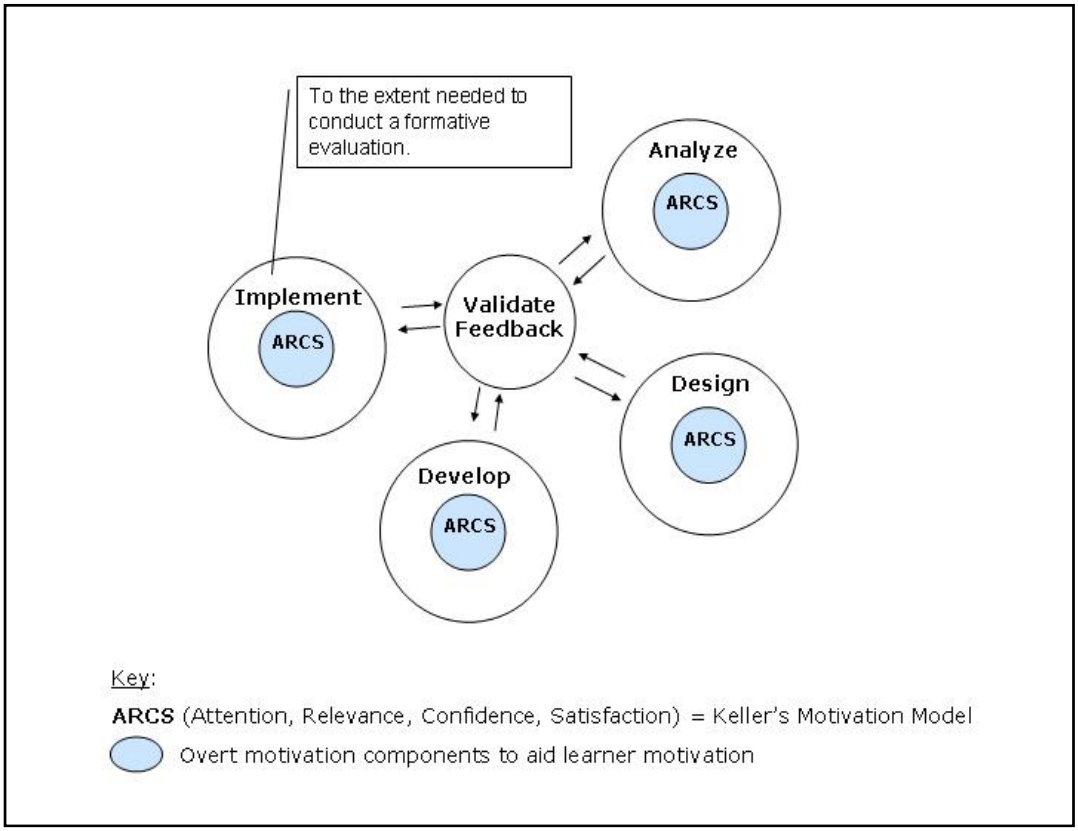

Figure 9: Implementation Phase

The designer met with computer technicians, responsible for managing content on Butte College servers, to ensure that the games were uploaded and functioning on the existing WIAH website from which students of Benoit's WIAH class would play the games during the formative evaluation.

Since human subjects were to be used in the formative evaluation, the designer obtained clearance from the Human Subjects in Research Committee at California State University, Chico and also prepared and made copies of Consent Forms to acquire signatures from students consenting to participate in the evaluation. Additionally, Sign-up Sheets were created to solicit volunteers for the game usability test and focus group. These documents can be found in Appendix D.

Evaluation

Validation/Feedback

Validation and Feedback represents the formative evaluation that is ongoing in the instructional design process. The designer returned as needed to information acquired in the Analysis, Design, and Development phases to ensure that the components of the Game-based Motivation Strategy remained focus on the project's goals and objectives.

Additionally, during the Evaluation phase, the designer performed formative evaluation tasks, which included: 1) usability testing of learning materials and game content input process, 2) creating assessment instruments, 3) creating the formative evaluation plan, 4) introducing and monitoring activities of the Game-based Motivation

Strategy, and 5) administering assessments and collecting data to be analyzed for improving the Strategy. See Figure 10.

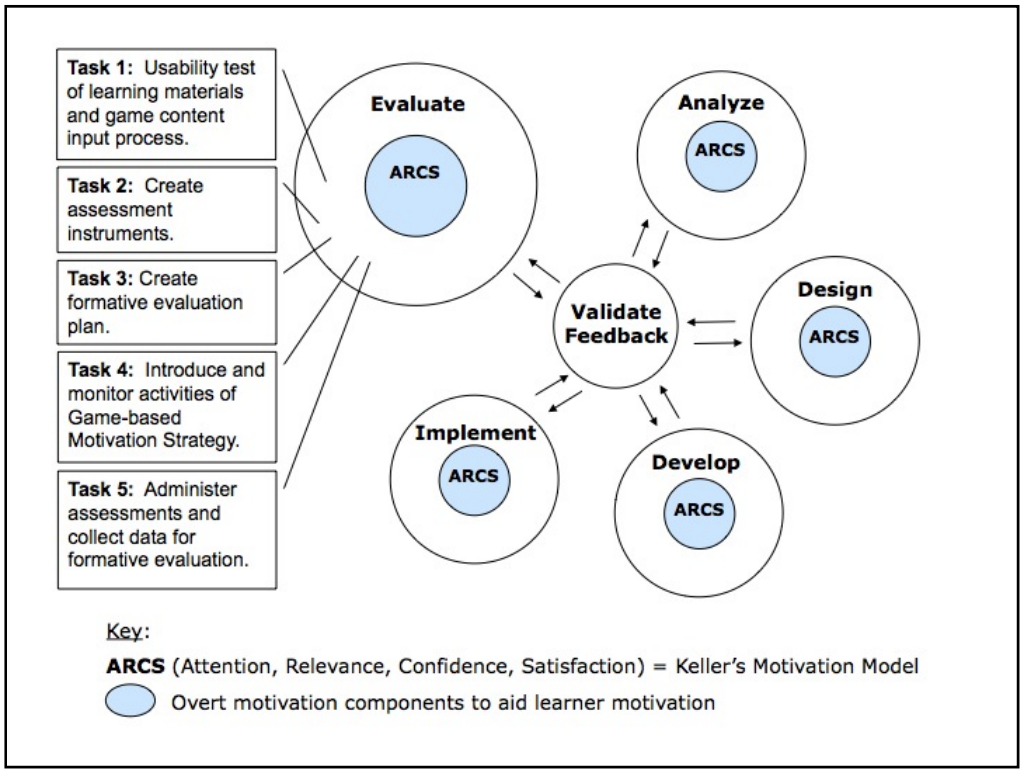

Figure 10: Evaluation Phase

Task 1: Usability Tests of Learning Materials and Game Content Input Process

Content collection for the preliminary games was an opportunity for the designer to test the design and function of the Game Content Development Forms so they would be effective tools during the Game Content Development Activity. To test the usability of the form, the designer observed one volunteer representative of the target audience complete the form. Results of the tested forms are in Chapter IV.

Game content input in the eGame Generator is a necessary function for the Game-based Motivation Strategy. Whether the individual entering information would be the student, the instructor, or a third party brought in specifically for this purpose, it was important for the designer to assess and revise the input process where necessary to improve efficiency.

First, to facilitate entering the data into the eGame generator, the designer typed the fifteen Game Content Development forms (one for each of the fifteen preliminary games) received from the instructor with edits and corrections. Next, the designer entered game content from each form into the generator. When all information was entered, the games were exported to a folder on the designer's computer as trial games.

One benefit of the eGame generator was that upon completing the third step in the generator, which is publishing, the eGames could be exported as shockwave files with embedded script that allowed the games to be played as stand-alone games on a computer or played as a Flash movie in a web page.

For testing the game content input process, the games were exported as stand-alone trial games. The designer solicited the help of a student volunteer, who was representative of the target audience and somewhat familiar with the subject matter. Immediately after the designer entered content in the generator for each of the fifteen games, the volunteer played each game to provide feedback on any missed information, or misspellings. See Chapter IV for results of the tested game content input process.

For testing the Content Review Sheet's design and function, one volunteer, representative of the target audience, was observed by the designer while completing the

Sheet. The participant was given an opportunity to make suggestions. Results of the tested Sheet are described in Chapter IV.

Task 2: Create Assessment Instruments

To gather information from learners for improving the components of the Game-based Motivation Strategy, the designer developed assessment instruments. It was important that the assessment or measuring instruments were designed with the characteristics of validity and reliability as discussed in the Literature Review.

Objectives, developed in the Design phase, were used to ensure that the data gathered on each instrument remained consistent with the goals of the project. The designer ensured face validity of the instruments by creating assessment items that related directly to the objectives. In addition, consideration was given to creating an appropriate number of items for each objective based on its exposure in the overall Game-based Motivation Strategy. For example, more items were created to assess learners' attitudes about game playing than game-content development since most of the objectives focused on students playing the games over several weeks in contrast to them developing the game content over one week.

The designer used reliable data collection methods such as Likert Scales (Likert & Hayes, 1957), Semantic Differential Scales (Osgood et al., 1967), and triangulation (Golafshani, 2003) to ensure reliability of assessment instruments for collecting data in the affective domain. According to Morrison et. al (2001), learning and performance are complex processes that affect the evaluation process. They encourage the use of multiple evaluation instruments to increase reliability of instructional outcomes (Morrison et al., 2001). Based on these reasons, the designer planned a methodological

triangulation using five assessment instruments. The development of each is described in the paragraphs that follow.

Usability Observation Chart. First, the designer developed a Usability Observation chart to gather information about learners' interactions with the games developed for this project (see Appendix E). To test the observation chart, the designer made notes on it while observing two adult volunteers playing one of the four Mankiller games. To start, the designer wrote a *letter code* for each participant in a space provided on the chart so that learner reactions could be matched to a letter (e.g., A or B) instead of participants' names. Next the designer read from the chart to direct the two participants in completing six tasks associated with testing the game. The chart included a place to record the time it takes to complete each task, whether or not assistance was needed, and observations about participants' behaviors. Results of the tested Usability Observation chart are described in the Results chapter.

Usability Survey. Second, the designer developed a survey to assess learners' attitudes about the game's design and navigation (see Appendix E). Immediately following the observation session, the participants were asked to complete the Usability Survey, which consisted of 13 Likert Scale items about the game. Test results for this instrument can be found in Chapter IV.

Questionnaire. Third, a Post-Game Development and Game Playing Questionnaire was developed by the designer to collect information about learners' attitudes concerning games, game-playing and the game content development activity (see Appendix E). Since the project's affective objectives consisted of multiple measures, multiple methods or triangulation were used to help increase validity and provide as

much relevant information as possible (Morrison et al., 2001). The Questionnaire consisted of the following types of measures: 1) Thirteen Likert Scale items, 2) Two Semantic Differential items, 3) One Rank Order item, 4) Three closed-ended questions, 5) Two open-ended questions, and 6) Three True/False items. The designer had the instrument reviewed by the SME and then solicited the help of a volunteer (representative of the target audience) to test the Questionnaire. To provide some background, the designer explained to the participant about the Game-based Motivation Strategy and how it would be implemented during the Women in American History Course. Additionally, the designer explained how the Post-Game Development and Game Playing Questionnaire would be used to assess students' attitudes about components of the Game-based Motivation Strategy. The designer then asked the participant to answer as many items as possible and write suggestions for improving the Questionnaire in the margins of the pages. See the Results chapter for results of the tested Questionnaire.

Focus Group. Fourth, the designer planned a follow-up focus group with student participants about the motivational characteristics of the Game-based Motivation Strategy. According to Phillips (1997) the focus group is a qualitative method that is set up to interview a number of individuals as a group. As an evaluation option, the focus group is helpful for probing deeper to collect data not easy to do adequately using simpler quantitative approaches (Phillips, 1997). The designer developed eleven interview questions. As recommended by Phillips (1997), the designer carefully planned and sequenced the questions to ensure the group remained focused on the topic during discussion. One individual familiar with the observation process was solicited to help with audio monitoring and taking observation notes during the focus group session. The

designer also planned a systematic observation of the group by determining what behavior to observe and preparing a form for an observer to use. Both the focus group questions and observation form is in Appendix E.

Instructor Interview. Fifth, the designer planned an interview with the instructor. Following guidelines proposed by Phillips (1997), questions were developed for an unstructured interview that allowed probing for deeper understanding from the instructor about the effectiveness of the Motivation Strategy toward enhancing instruction. Though twelve questions were developed for easy response, the designer also chose to include general questions, which were essentially open-ended, to encourage more detailed discussion about the topic (Morrison et al., 2001; Phillips, 1997). To view the interview questions, see Appendix E.

Task 3: Create Formative Evaluation Plan

To ensure an efficient formative evaluation of the Game-based Motivational Strategy, the designer developed a plan of delivery that focused on a strongly connected system for learning (Main, 1992b). To achieve this goal, it was important to recognize the cyclical nature of the strategy should the instructor continue to use it in future semesters. For example, each class of students play games (the content of which is developed by students from a previous semester) and participate in the game content development of new games, which are played by students in the next semester. Because the scope of this project was not beyond a formative evaluation of the Game-based Motivation Strategy, one semester was sufficient time to conduct evaluation of its two main instructional strategies. The designer consulted with the SME and decided to

conduct the delivery over fourteen-weeks of one semester to allow adequate time for delivering the instructional strategies, as well as for conducting evaluation activities.

After discussions with the SME, the designer developed a document entitled Data-Collection Timeline to plot the delivery and guide the formative evaluation of the Game-based Motivation Strategy. It also outlined the actions the instructor should perform and the actions the designer should perform during the delivery (see Appendix F). Before it was used, some inconsistencies were discovered. A description of revisions to the document is found in the Results chapter.

Task 4: Introduce and Monitor Activities of Game-based Motivation Strategy

The Game-based Motivation Strategy was delivered over fourteen weeks from January 25 to May 1, 2006. Participants included eighteen students enrolled in the WIAH hybrid course held at the Butte College Chico campus. Students attended class once a week for two hours on Wednesday evenings and each student was responsible for one hour online per week through their WebCT accounts. The designer verified prior to the first week that the classroom was equipped with a computer, projector and screen.

First Week. During the first 45 minutes of class, the instructor and designer together presented an attention getter; a Women's History IQ game (based on the *Pop It!* game template) for students to play as a class. The instructor usually conducts this activity in the first class of each semester as a brief paper-pencil-based quiz to assess students' general knowledge of the subject matter. The Women's History IQ game allowed the same assessment in a fun way and was a smooth segue to introduce the designer's masters project, the Game-based Motivation Strategy, and how it would be

employed in the class and evaluated during the semester. To view the designer's introduction of the project, see Appendix G.

Second Week. In the first 20 minutes of class, the designer introduced to students the game-playing activity; the first instructional component of the Game-based Motivation Strategy. On the projector screen, the designer first displayed the WIAH website on which the sample and preliminary games were posted and next demonstrated how to navigate to the games. Then the four Mankiller games were launched to introduce the four types of games students needed to become familiar with in order to participate in the game content development activity that would be introduced later during the semester.

Second Through Sixth Week. The women featured in the four sample and fifteen preliminary games coincided with the instructor's lectures, which included discussion on the lives of these women during class. For this reason, students were given five weeks to play the games during their time online (either from home or the school lab) to reinforce the subject matter and become familiar with how each of the four game formats were played. During this period, the instructor encouraged students to play the games to assess their own knowledge of the course material and help prepare for the course mid-term exam. The designer did not visit the class during this period, but remained in contact with the instructor for information about students' comments or changes in attitude and behavior in terms of playing the games.

Sixth Week. The designer solicited volunteers similar to the target audience from another Butte College WIAH class, taught by a different instructor, to participate in a focus group and a usability test of new games that would be created by Benoit's

students. These events were scheduled for later in the semester. The designer provided the instructor with sign-up sheets for this purpose.

Seventh and Eighth Weeks. No activities related to this project were scheduled due to the course mid-term during week seven and Spring break during week eight.

Ninth Week. School resumed. During the first 10 minutes of class, the designer briefly reviewed the purpose of the project and introduced to students the timeline and criteria of the game-content development activity; the second instructional component of the Game-based Motivation Strategy. Since a week had passed without students being in touch with the games, the class was moved to a computer lab, scheduled earlier to play the Mankiller games and review the four different game formats. After 20 minutes of playing, students were moved back to the classroom. Using the guided discovery strategy outlined in the Design phase, the Game Content Development activity was conducted by the instructor for the next 30 minutes.

First, the instructor asked students to form six groups. Next, the instructor asked the groups to choose the woman they wanted featured in their games from a list of women that would be introduced in class lectures during the remaining half of the semester. Each group was directed to choose a different woman, so that no groups had the same woman. The women that students selected were: 1) Helen Keller, 2) Sarah Grimke, 3) Elizabeth Cady Stanton, 4) Dorothy Day, 5) Anne Hutchinson, 6) Harriet Tubman, 7) Bella Abzug, and 8) Wilma Mankiller.

The instructor then presented a research assignment and criteria to the students. Each student was asked to decide on a game format (*Pop It!*, *Pair It!*, *Order It!*,

or *Connect It!*). Corresponding Game Content Development Forms were passed out with samples attached that showed how to complete the forms. Members of each group were directed to choose different game formats, i.e., one game format per group member. If a student chose the *Order It!* format, which has only seven fields for question/answer items, the student was directed to develop content for two *Order It!* games. After the instructor presented instructions for filling in the Game Content Development Forms, students were told they would receive recognition for their work. Group pictures would be taken during the next class session and after the games were reviewed for accurate content, their picture along with their game would be uploaded to the same WIAH website on which they played previous students' games.

Tenth Week. During the first 45 minutes of class, the instructor had students discuss within their groups the findings from their research and engage in a peer review of their completed Game Content Development Forms. To encourage reflection on the life experiences of the woman chosen, members of each group were directed to discuss the set of questions and answers they had filled in on the Game Content Development Forms. After the peer review, students submitted the Forms to the instructor, who checked them for content accuracy. While engaged in their reviews, the designer selected one group at a time and conducted them out of the classroom to a spot outside on the campus lawn to take their group photo. To organize information, the designer wrote each group member's name, the name and format of the game she/he developed content for, and the name of the woman researched by the entire group on the Group Photos and Game Record.

Eleventh Week. After the instructor edited the peer reviewed Game Content Development Forms, they were submitted to the designer. The designer then entered the content from the Forms into the game generator as described in the Development Phase. Next, the designer published the games as trial versions for content and usability testing scheduled the following week. Additionally, the designer created a Trial Games web page (see Appendix G), which contained links to the trial games. The web pages resided on the Butte College server as did the existing WIAH website, which the designer chose not to link to. This was to make sure that those participating in the Usability Test would have access only to the games to be evaluated. After each game was exported as a shockwave file and linked from the trial web page, the designer also generated Print Copies from the game generator that showed the questions and answers entered for each game. The Print Copies were matched and attached to their respective Game Content Development Forms. This allowed the designer to verify with students that the information put in the eGames Generator was the same information on the Game Content Development Form.

Twelfth Week. On Wednesday, April 12th, the first 30 minutes of class, the designer returned the Game Content Development Forms with attached Print Copies to the students and introduced the last step of the game content development activity; the Content Review Sheet. The designer explained the instructions attached with the Sheet, which was a two part process. The first part explains how students should review the content of their games using the Print Copy after playing the trial versions of their games on the given website. The second part explains how students should review one of the games authored by another member of her or his group. Students were given one week to complete the review. They were instructed after completion of the review to return the

Game Content Development Forms, Print copies, and Content Review Sheets to the instructor, who would review them before giving them to the designer.

Task 5: Administer Assessments and Collect Data for Formative Evaluation

Twelfth Week Continued. On Friday, April 14th, using four of the trial games that represented the four game templates chosen for this project, the designer conducted a Usability Test focused on each template's design and navigation ability. The designer solicited the help of one student familiar with observing usability tests and filling in observation forms to assist with conducting the Usability Test. Four volunteers solicited earlier in the semester from another WIAH class and somewhat familiar with the games' subject matter participated. Because one of the places students were encouraged to play the games was on a computer at the school's lab, evaluation of the games were scheduled to be observed in a lab setting on the Butte College main campus.

Before the Usability Test, the designer launched the Trial Games web page on four computers situated adjacent to one another. Upon their arrival, each participant was asked to sit at one of the four computers displaying the web page. Some of the games contained sound effects, and since the lab did not provide headsets for computer users, the participants had been informed a week before to bring their own. One hour was allowed for the Usability Test. The designer first briefly introduced the scope of the project and had each participant sign an informed consent form for participation. Next, the designer assigned each participant a letter A, B, C, or D, which was written on observation forms to be used by the designer and the designer's assistant. The designer stood behind participants A and B. The assistant stood behind participants C and D. The

designer then informed participants that they would be given specific directions to perform six separate tasks associated with testing a game while observation notes of their reactions and behaviors would be taken. Other than answering evaluation and computer-related questions, the designer and assistant did not provide any other information to participants. Tasks directed by the designer and performed by the participants were completed in approximately six minutes. Immediately afterwards, participants were asked to complete a Usability Survey about the game. Upon administering the Usability Survey for each of the games "Putting Life in Place: Part 1," and "Hats Off to Bella!" the designer informed participants to skip item nine, which referred to sound effects, as those games did not contain sound effects during game play. Likewise, participants were informed to skip item seven for each of the games "E. C. Stantagies" and "Putting Life in Place: Part 1" because item seven referred to game hints, which were not included in those games. The Usability testing and Survey were conducted four times to evaluate each game template represented by the following trial games:

1. Guerrilla Warfare (featuring Harriett Tubman) – Pop It! Format
2. Elizabeth Cady Stantagies (featuring Elizabeth Cady Stanton) Pair It! Format
3. Putting Life in Place: Part I (featuring Helen Keller) – Order It! Format
4. Hats Off to Bella! (featuring Bella Abzug) – Connect It! Format

Thirteenth Week. The designer analyzed the data collected from the Usability Test Observations and Usability Surveys. Results of data analysis from both assessments can be found in Chapter IV.

After revising all of the trial games, they were uploaded to the WIAH website (the same site where the preliminary games resided) along with corresponding group photos that identified each game's content authors.

Fourteenth Week. On Wednesday, April 26th in the first 45 minutes of class, the designer conducted other assessments of the game-based motivation strategy. Out of eighteen students enrolled in the class, seventeen participated in the game playing and game content development activities during the semester. First, students were asked to sign consent forms. Then they were moved to a computer lab in the same building. Next, they were instructed on how to access the website that contained the trial games the designer had uploaded the week before with revisions. They were allowed 20 minutes to play the games that they authored and any of those authored by their peers while the designer observed overall student behaviors. When time was up, students were instructed to return to the classroom. The designer then passed out the Post-Game Development and Game Playing Questionnaires to the students. They were given approximately ten minutes to complete the questionnaire, results from which can be found in Chapter IV.

A focus group was conducted for gathering more in depth information on students' attitudes about their game-playing and game-content development experiences. The designer asked for volunteers to participate. As a result, all seventeen students attending class that day wanted to participate in the Focus group. A few weeks earlier, the designer solicited help from a student not enrolled in the WIAH class and who was familiar with recording observations for focus groups, to assist with audio recording of the discussion and to take observation notes of the group while the designer asked specific questions. Focus group responses are presented in the Results chapter.

The designer gathered more in depth information about the Game-based Motivation Strategy by having the instructor answer specific questions by email. Results from the instructor's interview are compiled in Chapter IV.

If fully implemented, WIAH students in the following semester would play the games developed by Benoit's students, just as the current students had played games authored by WIAH students from a previous semester. For this reason, the designer solicited help from volunteer students to play the revised games and participate in a focus group on Friday April 28th. The students came from another WIAH class that was taught by a different instructor. This effort was to assess student attitudes toward playing games created by their peers, the results of which are described in Chapter IV.

CHAPTER IV

RESULTS OF FORMATIVE EVALUATION

Findings and Revisions

Usability Tests of Learning Materials and Game Content Input Process

Game Content Development Forms. It was apparent from some of Benoit's editing marks and the way the Game Content Development forms were filled out that some of the directions were not clear as to how long question and answer items should be. For example, in the *Connect It!* game, characters (including spaces), cannot exceed 260 for questions and 60 for answers. In the *Pair It!* game, though it was stated that both questions and answers cannot exceed 80 characters, this was an error and was changed to 50 characters. In the *Pop It!* game, both the question (stimulus) and answer (response) cannot exceed 60 characters. And lastly, in the *Order It!* game, characters cannot exceed 45 for each statement listed. Even though the character limits were indicated on the forms, the designer bolded these statements to make sure they stood out. The designer also added a space on each form for students to cite sources for their game content. The volunteer testing the form provided positive feedback. Based on the volunteer's verbal feedback—a completed sample of the game content development form was attached to the blank forms demonstrating the correct way to fill out the form and to help reduce errors and inconsistencies when using the forms again. Using content from the Mankiller

games, the designer developed four samples of the revised game content development forms, one of which is included in Appendix H.

Data Input Process in eGames Generator. After trial uses by this designer, the eGames Generator was found consistent with von Hippel and Katz's (2002) recommendations for an efficient game-generating program. Input mistakes were found on some of the games by the volunteer assisting in the testing of the game content input process. The designer made all necessary corrections on the game content in the eGames Generator and then exported them again. The data input, testing, and revisions for one game were accomplished in approximately 30 minutes; a total of seven hours and a half for the 15 preliminary games.

Content Review Sheet. The volunteer being observed while completing the Content Review Sheet demonstrated that it was easy to use. Based on the volunteer's suggestion— a cover sheet of instructions on how to complete the Sheet was added to help reduce errors and facilitate understanding the purpose of each part of the document. A sample of the revised Content Review Sheet, which includes instructions on how to complete it, can be found in Appendix H.

Tests of Assessment Instruments

Usability Observation Chart. After testing the Usability Observation chart, one of the two participants that were observed suggested that a brief explanation about the overall project be mentioned before starting the test. The designer added a brief script at the top of the Chart that described the purpose of the project and how participants would be involved in the game usability test.

Usability Survey. Upon completing the testing of the Usability Survey, the participants recommended that a space be provided on the Usability Survey to include additional comments. The designer believed this was important to include since it allowed feedback from learners about improving the quality of the games.

Post-Questionnaire. Testing the Post-Game Development and Game Playing Questionnaire yielded useful suggestions. The participant suggested an example be included that demonstrated how to complete the two Semantic Differential items and the Rank Order item. To engage the affective domain while completing the Questionnaire, the designer believed it would be beneficial to personalize the experience of answering the assessment questions by changing the Likert Scale statements to read in first person rather than in third person. After the designer made all changes, the same participant tested the instrument again two days later. Based on the participant's feedback and the ease with which the participant completed the Questionnaire, no additional changes were made to the Post-Game Development and Game Playing Questionnaire.

Formative Evaluation Plan:
Data Collection Timeline

During the first week of formative evaluation, it was found on the Data Collection Timeline document that some of the information placed in the Data Collection Activity column was better suited for the Class Activity column. The day of the week was also added to that same column because some of the evaluation activities took place on two different days of a week. To clarify its purpose, the designer renamed the document Data Collection Timeline for Formative Evaluation of the Game-based Motivational Strategy.

Monitoring Activities of the
Game-based Motivation Strategy

At the end of the game content development activity, the instructor shared with the designer some of the comments she was hearing from her students about the difficulty they were having playing the *Pop It* and *Connect It* games. After a few discussions with the instructor, the designer decided to add *Hints* to trigger the correct answers from learners, increase learner confidence, and motivate learners to continue in the learning experience (Jo, 1993). Since the eGames Generator did not provide an area on the game board interface to add hints, the designer added them to the navigation bar on the left side of each game's web page under the heading *Possible Answers*. The web pages were duplicated from a designated page in the existing WIAH website.

Game Usability Testing Observations

The Usability Test was a direct observation of learners' reactions to and ability to navigate through the four game templates. For the sake of this report, the learners will be known as users A, B, C, and D. First, the users were directed by the designer to click on the Trial Games link on the web page displayed on their computers. Second, they were directed to click on a specific game title to launch the game. Third, they were instructed to wait until the game loaded and then read the game's instructions, which is a brief paragraph that comes up first on the game's interface. Fourth, the designer informed them after approximately 40 seconds that if more explanation was needed, they may click on the link for Game Details in the left navigation bar anytime during the game. Fifth, the users were instructed to begin playing the game at level one. levels two and three were not played since there is no difference in game interaction

between the levels except a shorter time provided to play at each higher level. Users were directed to click the *STOP* button when *Game Over* appeared on the screen. Sixth, users were directed to click on a link in the upper left corner of the page to go back to the Trial Games web page.

Significant findings fell into four categories for all four game templates:

1) The length of time the users took to read the game's instructions
2) The user's reference to the Game Details for more explanation about the game
3) The user's ability to navigate the game and use its controls during game play
4) The length of time the user played the game

Game results for each category are described below.

- Guerrilla Warfare – Pop It! Format:

1) In this game, user A took 15 seconds to read the game instructions. Users B and C took 30 seconds and user D took 60 seconds.

2) Out of the four users, only user D clicked on the Game Details link for more explanation about the game.

3) Upon receiving instructions to begin playing the game at the first level, all four users clicked the *Level 1* button followed by clicking the *Play* button without any difficulty. When the game board appeared, only user D appeared to know how to begin playing the game and clicked in the answer field to begin filling in answers to the questions that popped up on the board about Harriett Tubman. For approximately 30 seconds, user A appeared to be wondering how to begin playing before clicking the answer field and answering the questions that popped up. Users B and C appeared to be searching for how to begin playing as well. They did not

see the field underneath the game board for typing in answers to the questions that popped up on the screen. User B attempted to activate the game by typing on the keyboard. User C attempted to activate the game by clicking on the squares containing the questions on the game board.

4) The objective of the *Pop It* game at level one, is that users must complete all questions that appear on the game board before two minutes is up. Users A and D completed many of the questions before time ran out. For users B and C, the game timed out before they figured out how to begin.

- Elizabeth Cady Stantagies – Pair It! Format:

1) Users A, B, and C took 15 seconds to read the game instructions. User D took 35 seconds.

2) Out of the four users, only user C referred to the Game Details for more explanation on how to play the game.

3) Upon receiving instructions to begin playing the game at the first level, all four users clicked the *Level 1* button followed by clicking the *Play* button without any difficulty. When the game board appeared, all users had no difficulty figuring out how to begin which was to click on a pair of boxes containing related information. Unlike the featured woman of the first game, all users appeared to be more familiar with information about Elizabeth Cady Stanton as evidenced by the quick pairing of related statements before the time ran out.

4) The objective of the *Pair It* game at level one, is that users must match all pairs of related statements that appear on the game board before 1 minute, 30 seconds is up. All users beat the clock. User B completed the game in 45 seconds,

user C in 57 seconds, user D in one minute and two seconds, and user A in one minute and three seconds.

- Putting Life In Place: Part I – Order It! Format:

1) Users A, C, and D took 10 seconds to read the game instructions and user B took 20 seconds.

2) None of the users chose to click the Game Details link for more explanation about the game.

3) Upon being instructed to begin playing the game at the first level, all four users clicked the *Level 1* button followed by clicking the *Play* button without any difficulty. When the game board appeared, user B had no difficulty figuring out how to begin. The object was to drag and drop statements about the life of Helen Keller into chronological order. At first users C and D did not know what to do, but in less than 30 seconds, they began to drag and drop the statements into correct order. User A appeared to be searching the game board for a clue on how to begin.

4) The objective of the *Order It* game at level one is that users must arrange all statements that appear on the game board into correct order before two minutes is up. User B completed the order of all statements with a score of 100% before time ran out. User C and D scored less than 100% and did not finish putting the statements in order before time ran out. The game timed out before user A figured out how to begin.

- Hats Off To Bella! – Connect It! Format:

1) In this game, user C read the game instructions in 10 seconds, user A in 15 seconds, and users B and D in 30 seconds.

2) None of the users, except user D, chose to click the Game Details link for more explanation about the game.

3) Upon receiving instructions to begin playing the game at the first level, all four users clicked the *Level 1* button followed by clicking the *Play* button without any difficulty. When the "Tic, Tac, Toe" style game board appeared, all users had no difficulty figuring out how to begin which was to first choose a category by clicking on one of the nine boxes labeled *Heritage* or *Historical*. Once a category is chosen, a question from that category appears to the right of the boxes. Below the question is a field for typing in an answer. For every correct answer, an *X* is entered in the category box. For every wrong answer, an *O* is entered. The object is to get three questions correct that result in three *Xs* entered in a row (diagonally, horizontally, or vertically) on the game board. All questions are about the life of Bella Abzug and two minutes are allowed to answer each question that pops up.

4) Users A and C appeared frustrated about how to play the game after selecting a category. User B appeared to understand how to play the game but did not know answers for many of the questions. User D took approximately 30 seconds before actually beginning to answer questions correctly, but only user D scored three *Xs* in a row. The game timed out for users A. B, and C when they acquired all Os in a row due to too many incorrect answers. Immediately after

playing the game, the users appeared as though they had played a very challenging game.

The Designer's Interpretations. From the combined observations, the designer discovered that given different learning styles, no two users approached and played every one of the games in the same way. One or two were slower readers than the others, depending on which game instructions were being read. One or two were more familiar with the subject matter than the others depending on which woman from American history was being featured in the game. And depending on the game format, one or two users appeared to be more at ease navigating through a game than the other users. The *Pair It!* game was the easiest to figure out and play for all users, which appeared to be due to both the simplicity of the game objective and rules, as well as the users' level of familiarity with the featured woman from American history, Elizabeth Cady Stanton. Users' familiarity with the game was determined by how quickly and accurate questions in the game were answered. In contrast, the *Connect It!* game was not easy to figure out and play for most of the users even though only one user showed a higher level of familiarity with the game's featured woman, Bella Abzug. In comparison, the *Pop It!* game was easy to figure out and play for only two of the users. Of these two users, only one user was very familiar with the game's featured woman, Harriett Tubman. Similarly, the *Order It!* game was easy to figure out and play for three of the users even though all the users were familiar with Helen Keller, the featured woman of the game's content. The focus of the observations were primarily on users' reactions and abilities to navigate through the games, regardless of their level of familiarity with the games'

subject matter. Clearly, the *Pop It!*, *Order It!*, and *Connect It!* games were lacking in clarification of game instructions and or some elements on the game's interface design.

Usability Survey

The Usability Survey consisted of 13 Likert Scale questions and one open-ended question. The scale for each question was comprised of four responses from which the learner could choose and to which the designer assigned numerical rating points: strongly disagree = 1, somewhat disagree = 2, somewhat agree = 3, and strongly agree = 4. Only one question was a measurement of a negative or reversal statement to which the designer assigned numerical rating points from the opposite direction on the scale: strongly disagree = 4, somewhat disagree = 3, somewhat agree = 2, and strongly agree = 1.

The designer's observations were supported by findings on the Usability Survey, which revealed information on the users' attitudes about the games. The following paragraphs describe how points from each survey was compiled indicating how the users rated each game overall.

Guerrilla Warfare – Pop It! Game. The highest points that could be expected were 52 equaling a score of 100%, thirteen items rated at the highest value of four points each. Users A and B failed to answer item nine, which asked about sound effects in the game, therefore no points could be counted on their surveys for this item. The points for User A totaled 32 (62%), User B – 38 (73%), User C – 33 (63%), and User D – 44 (85%).

Elizabeth Cady Stantagies – Pair It! Game. The highest points that could be expected were 48 (100%), twelve items rated at the highest value of four points each. Users A and C provided responses to item seven, but since there were no hints included

in this game, the responses were invalid. Users A, B, and D failed to answer item nine, which asked about sound effects, therefore no points could be counted on their surveys for this item. The points for User A totaled 38 (79%), Users B and C – 41 (85%), and User D – 42 (88%).

Putting Life in Place: Part 1 – Order It! Game. Forty-four points equaling a score of 100% was the highest to be expected from the *Putting Life in Place: Part 1 – Order It!* game (i.e., eleven items rated at the highest value of four points each). User C provided responses to items seven and nine, but since there were no hints or sound effects included in this game, the responses were invalid. The points for User A totaled 28 (64%), Users B and C – 43- (98%), and User D – 35 (80%).

Hats Off to Bella! – Connect It! Game. The highest to be expected and equal to a score of 100% was 48 points, twelve items rated at the highest value of four points each. User C provided a response to item nine, but since there were no sound effects included during the play of this game, it was an invalid response and was not counted. The points for User A totaled 37 (77%), User B – 46 (96%), User C – 31 (65%), and User D – 43 (90%).

To determine which game received the highest ratings, the designer combined the total points from each user for each game and divided by four (the number of users) to find the average points. To determine each game's average percentage score, the highest points expected from the game was used to divide the resulting number. The average scores were as follows:

1. Guerrilla Warfare – Pop It: Avg. points - 37 (71% score)
2. Elizabeth Cady Stantagies – Pair It: Avg. points - 41 (85% score)

3. Putting Life in Place: Part I – Order It: Avg. points - 37 (84%)

4. Hats Off to Bella! – Connect It: Avg. points - 39 (81%)

For the open-ended item at the end of the survey, comments were compiled from each user and are listed in Appendix I.

The Designer's Interpretations. Consistent with the designer's findings of the game most enjoyed and the one which all users completed before time ran out during the Usability Testing observations, the users rated the *Pair It!* game the highest in comparison to the other games.

One of the users commented on making changes in the games' Font color and size. Unfortunately, Font modifications were not in the designer's control as these settings were inaccessible in the eGame Generator. Another comment referred to changing the way the user chooses a question in the *Connect It!* game. This is a design function of the template itself, and in the eGame Generator, the designer did not have the option to alter it in any way.

Trial Games Revisions. During week thirteen, the instructor collected eleven completed Content Review Sheets from students and submitted them to the designer. Based on the Usability Testing observations, Survey comments, and student additions on the Content Review Sheets, the designer made the following revisions to the trial games:

1. For each game where sources were missing, source citations were added to the area below the game instructions on the first screen.

2. Corrected grammatical errors, misspellings or omissions.

3. Revised the wording in the instructions so that the game objective and rules were clearer for each game format as follows:

Replaced *Pop It* with the name of the game (e.g. Guerilla Warfare) and added the sentences: *Your objective is to rapidly type the matching response to each item in the field at the bottom of the game grid. Possible answers are listed on the left of the page. For larger text (possible answers text only), go to the view menu at top of the browser. Mouse-over the text size option and choose your desired text size.*

Replaced *Pair It* with the name of the game.

Replaced *Order It* with the name of the game and added the sentence: *Use mouse to drag and drop statements in correct order.*

Replaced *Connect It* with the name of the game and replaced the terms *topic* and *topics* with *category* and *categories* respectively.

The time clock was changed from two minutes to three minutes for level one of the *Pop It!* game. For *Connect It!* the time was changed from two minutes to one minute and 30 seconds for level one. No changes were made on the time duration for *Pair It!* and *Order It!* games.

See Appendix I for screen captures showing revisions to the instruction screens of the four game formats.

Post-Game Development and Game Playing Questionnaires

After categorizing the Questionnaire items under the themes represented by the seven affective objectives, the designer compiled the following results from 17 participants.

Perceptions About Online Learning. Fifteen participants agreed that playing the games made their online learning experience more interesting. Eleven agreed that they liked taking courses online; and only three agreed that they prefer online courses to courses offered in classroom settings. Participants rated playing games online as a favorable activity (good, exciting, harmless, wise) with 28 being the highest rating score possible or as an unfavorable activity (bad, dull, harmful, and foolish) with four being the lowest rating score possible. Ten participants rated the activity between 25 and 28; five rated it between 20 and 24; and two rated it between 17 and 18.

Perceptions on Playing Games to Engage Longer with Subject Matter. Thirteen participants agreed that they were motivated to read more about women in American history after playing the games.

Perceptions of the Design and Function of the Games. All 17 participants agreed that it was easy to gauge their progress using the games' scores while playing each game. All 17 also agreed that when playing the games, they found the game instructions helpful. Eight ranked the *Pop It!* game as their favorite, while six ranked the *Pair It!* game as their favorite. Seven indicated that they completed levels one and two of the games; four completed levels two and three; and six completed all three levels.

Perceptions of the Games as Assessment Tools. All 17 participants agreed that playing the games helped them recall significant facts and events about the women they studied in the course. All 17 agreed that the games helped them prepare for course quizzes and exams. Five agreed that they found it difficult to use the games as an assessment of their progress in the course. Eight participants indicated that they played any number of the games more than three times to prepare for quizzes and exams. One

played the games three times; six played twice; and two played only once. However, thirteen indicated that they did not rely on playing the games only to prepare for a quiz or exam.

Perceptions on Other Ways to Prepare for Quizzes. Sixteen out of 17 participants indicated other ways they also reviewed course material to prepare for quizzes, was to read texts and handouts, take notes with lectures, do online research, review class notes, study past exams, rewrite and study questions from the games, do online field trip assignments, and visit websites about women in American history.

Perceptions About the Game Content Development Tasks. Fifteen out of 17 participants agreed that they believed their groups developed questions and answers for the games according to the instructor's standards. Fifteen out of 17 also agreed that they believed their groups completed the Game Content Development Form according to the instructor's standards. Fifteen out of 17 agreed that developing content for the games helped them reflect on experiences of the woman they were researching. Students rated participation in the game content development tasks as a favorable activity (worthwhile, interesting, challenging, and instructive) with 28 being the highest rating score possible or as an unfavorable activity (a waste of time, boring, easy, and useless) with four being the lowest rating score possible. Six participants rated the activity between 25 and 28; five rated it between 20 and 23; and six rated it between 12 and 17.

Perceived Learning About the Course Subject Matter. Thirteen out of 17 participants believed they knew enough about the women, which were the subject of the games they played, to perform well on the final exam.

Actual Learning About Course Subject Matter. A majority of the participants answered three True/False statements correctly and thereby met the one cognitive objective, which was to be able to recognize three facts from the game's content by choosing the correct answer. Sixteen students correctly chose *True* for the statement: *Harriet Tubman was a conductor for the Underground Railroad Organization.* Ten correctly chose *False* for the statement: *Elizabeth Cady Stanton helped found the National Women's Political Caucus;* and Twelve correctly chose *True* for the statement: *Helen Keller became a member of the Socialist Party of Massachusetts.*

Focus Group One

The first focus group conducted by the designer was designed to gather more in-depth information from the seventeen students who participated in the Game-based Motivation Strategy over the semester. A summary of participants' comments follows.

Half of the members of the group indicated that they like to play some sort of games outside of school such as card games, board games, and sport games. Winning and competition were expressed as features that they liked about those games. In comparison, members of the group stated that they liked the competition of improving their personal score when playing the Women in American History games and added that they liked the easy access to the games online. Some expressed that the time set to complete a game was too short. The games with *hints* or *possible answers* were helpful because they triggered answers to some of the questions that were vague. Most did not like having to type in answers that were case, space, or word sensitive. A couple members did not think the points gained were useful because the sound effects indicated if an answer was wrong or right. They suggested that losing points would help make the games more interesting.

To improve those games where answers are typed in, it was suggested to make it possible to just click on answers instead. After clicking the pause button, keep the game board visible. Add more visuals; add a control to change game colors; and add more sound effects.

As for developing content for the Women in American History games, participants stated that it was difficult to use long questions because there were character limitations in the games. Therefore, some of the questions had to be changed to fit the game's design, which affected what was intended originally for the content. Most thought that their recall of information in the WIAH course was better having participated in developing content for the games. In order to write the questions, one student commented that they really had to understand the information. Having to rewrite and put information into chronological order for the game content development activity helped some members learn more.

One member commented that playing games online was good for kinesthetic and visual learners. The majority of the members thought that game playing online as part of higher education courses was good for reviewing class material. Overall members appeared positive about the addition of games to their online learning experience in the Women in American History course.

Focus Group Two

The second focus group conducted by the designer was designed to get a peer group's immediate reaction to the games developed by Benoit's students. They were asked the same questions as members in the first focus group except for the two questions

about developing content for the games. The groups' comments are summarized as follows.

All members indicated that they liked to play some sort of games outside of school such as video games, card games, and online games. They stated that those games were fun and challenging. In comparison, the Women in American History games, which were based on familiar games like Tic Tac Toe and Concentration (matching) were fun plus they were educational. Most of the members agreed that the games created by students in Benoit's WIAH class were interesting and most were challenging. One member indicated that typing in the answers made the games even more challenging. To improve the games, there was a consensus from the group to make the *hints* or *possible answers* more obvious. Put them on the right side of the page instead of the left or at the bottom so that they appear less like navigation links.

Other suggestions for improving the games included adding pictures or descriptions of the woman being studied. A few commented that they would use the games to prepare for quizzes and exams if the games included exactly what the instructor would have on the tests. One member did not think she would learn well playing the WIAH games because of the typing involved. She preferred writing things down. Although, after studying, she would use games as a review. Another member said playing games was a convenience, and if given the choice to read a textbook or play a game online, playing the game would be preferred. The majority of the members thought that game playing online, as part of higher education courses, was a good idea.

Instructor's Interview

In terms of the games meeting the instructor's expectations, Benoit reported, the games were wonderful. Adding the hints helped decrease frustration from the difficulty of remembering content when just learning about the subject. The students seemed to love the games once they got into them. Concerning students' playing the games to prepare for tests or assess their knowledge of course content, Benoit expressed that students were slow starters at first and not motivated to do much reading or assignments. By the time of the midterm, they were all playing the games. It appeared to motivate them once they got going. Playing the games helped as assessments, but creating the games was even better. Benoit described students as confused and hesitant at first when participating in the game content development tasks. She attributed this to her findings that generally students today are conditioned to memorize information for tests but they don't really learn the material. Creating a game forces you to really learn the content. She pointed out that students lacked motivation throughout the semester, but definitely believed that playing the games and participating in the game content development tasks motivated students to want to learn more about the subject matter. She surmised students probably would have done far worse on exams if there had not been games for them to play. In terms of appreciation for the subject matter, Benoit explained, this generally seems to happen in this course no matter how it is taught. Most of the students are women and by the end of the course, they realize how much they have taken for granted (personal communication, Benoit, May 2006).

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The main goal of this project was to improve the online learning experience of adult learners enrolled in the Women in American History course at Butte College. A Game-based Motivation Strategy was created to address the lack of motivation expressed by students while online. It consisted of two major components:

1) Game playing
2) Game content development

The Game-based Motivation Strategy was designed to be delivered over one academic semester and integrated with the instructor's delivery of WIAH course curricula. Given the motivation problem, the affective domain to learning was addressed using Main's (1992) Integrated Motivation Instructional Design (IMID) model.

After the motivational problem was defined in the analysis phase of the project, the design of the game-based motivation strategy began. Affective and cognitive performance objectives were developed with criterion measures to assess performance.

The game-playing concept was based on a blended learning theory approach consisting of constructive learning, metacognitive learning, and hide-the-guide tactics.

Game templates were assessed using Gagne's Nine Instructional Events to ensure their effectiveness as learning mediums.

The game content development was based on another blended learning theory consisting of collaborative learning, discovery learning, and guide-on-the-side tactics. Using a four-step guided discovery approach, the information for the game content development activity was organized into tasks.

Next, the development of the Game-based Motivation Strategy began. The designer selected Carson Media eGames Generator to generate all the necessary games for the project. It was chosen for its efficiency and effectiveness in generating games that met the needs and objectives of this project. Based on the eGames Generator input process for four game formats, the designer developed corresponding Game Content Development Forms, which were used in the Game Content Development Activity.

Assessment instruments and a formative evaluation plan were developed to aid in the delivery of the Game-based Motivation Strategy over fourteen weeks and the conducting of its evaluation at the end. For the first several weeks, eighteen students played games that featured women from the WIAH course subject matter. During the ninth week, the students participated in the game content development activity, which allowed them to research women assigned by the instructor and develop questions and answers for new games. The students formed small groups to discuss and review their question/answer content.

Trial versions of the students' games were generated and exported to an existing WIAH website. Usability tests were conducted on four of the students' games, which were based on four different game formats. Volunteers from another WIAH class

representing the target group were observed playing the games. They completed a thirteen-question usability survey to determine the effectiveness of the game formats' overall design and navigation.

After the game content review, which was the last step of the game content development activity, the designer made minor revisions to the games based on responses on the usability surveys and content review sheets. The revisions included rewriting the instructions so that the game objective and rules were clear for all four game formats, correcting grammatical errors, misspellings or omissions, adding source citations where they were missing from some games, and changing the time allotted to play at level one for two of the game formats.

During the fourteenth week, 17 out of 18 students played their own revised games and immediately afterward, each participant was given a Post Game Development and Game Playing Questionnaire. Completing the Questionnaire was the condition under which all objectives were to be performed. The standards by which all the affective objectives were to be performed were according to the response on the Questionnaire that best reflects the participant's feelings. The standard by which the cognitive objective was to be performed was by choosing the correct answer on the Questionnaire.

Using Kirkpatrick's (1975) evaluation approach the designer aimed to evaluate at level one the achievement of affective domain objectives categorized into seven themes discussed in the Design phase. The aim was also to evaluate at level one, learners' perceived learning and at level two the achievement of one cognitive domain objective, i.e., learners' actual learning. The overall focus was on learners' reaction to and attitudes about components of the Game-based Motivation Strategy. The evaluation

did not check for learning outcomes beyond what learners perceived to achieve or actually achieved in the short time engaged with the components of the Game-based Motivation Strategy.

Additionally, the designer conducted a focus group to determine which aspects of game playing and game content development were favorable and unfavorable in the context of online learning in higher education. The focus group also generated information about the design and navigation of the games.

As discussed in Chapter III, if the Game-based Motivation Strategy continued beyond one semester, each class of Benoit's students would play games, (the content of which would be developed by students from a previous semester) and students would participate in the game content development of new games, which would be played by students in the next semester. Given the cyclical nature of the Game-based Motivation Strategy, the designer conducted a focus group with volunteers from another WIAH course to get a student peer group's immediate reaction to the games developed by Benoit's students.

Responses from both focus groups were documented and the suggested changes along with others that were not under the designer's control are reflected in the recommendations section of this chapter.

The project's deliverables included web pages with embedded games uploaded to the Butte College server and linked to WebCT for use in the WIAH course (see screen captures in Appendix J), and the Game-based Motivation Strategy Delivery Plan with accompanying forms also in Appendix J.

Conclusions

A formative evaluation of the Game-based Motivation Strategy consisted of usability evaluations of the games' design, function, and navigation conducted by the designer. Furthermore, focus groups and surveys were conducted to assess learners' attitudes about game playing, game content development tasks, and the use of games' as course assessment tools. Based on information gathered from the evaluations, the designer provides the following conclusions.

The evaluations revealed an overall positive reaction to the Game-based Motivation Strategy. The Post Game Development and Game Playing Questionnaire showed that the majority of students met the seven affective objectives assessed with positive reactions. Students agreed their online learning experience was made more interesting by playing games; that more than half were motivated to read more about women in American history after playing the games, which they rated as a favorable activity. The Questionnaire also showed that developing content for the games helped students reflect on experiences of the women they were researching; and that it was a favorable activity. Additionally the Questionnaire suggested that the students were able to learn from the games. The one cognitive objective measured only short-term lower-level knowledge retention. Because the majority of students met the objective, the designer determined that the games potentially served as effective assessments of information.

The focus groups revealed students' positive reactions toward game playing online as well. For example, many indicated that they liked the competition of improving their personal score and the easy access to the games online. Most thought that their

recall of information in the WIAH course was better having participated in developing content for the games.

The usability testing observations of the games indicated students' ability to use the basic game controls to navigate through the games, but disclosed some other weaknesses in the design of the games in terms of their appearance, for example, user's ability to add pictures, change color, and Font size. Another weakness had to do with capacity to allow the user more freedom with the game structure and content (e.g., no limits on letter characters of questions and answers).

The follow up interview with the instructor uncovered another perspective about the impact of game-playing and game content development on students' performance as well as the potential implementation of the overall Game-based Motivation Strategy as part of the course instruction. The findings of student's positive reactions toward game-playing and the game content development was consistent with the instructor's objectives of wanting to motivate students to learn in a different way; share what they had learned with others; work together in small groups; and have a positive experience in the class. The instructor indicated that student participation in the game playing helped, but participation in creating the content for the games was even better. As for integrating the strategy as part of instruction, the instructor reported some content that is usually covered was not done due to the game delivery and game content construction sessions. Furthermore, keeping up the game input process might be a challenge for the instructor doing it alone given its time consuming nature.

The designer concluded that the formative evaluation of the Game-based Motivation Strategy revealed some successes and some ineffective aspects of its major

components. The application of ARCS in the evaluation phase ensured that attention to learners' motivations was at the forefront. Though measuring motivation is difficult as noted by Main (1992) and other researchers, the designer attempted to apply Main's types of measures described in the Literature Review.

For example, an assessment of learners' *attention* was acquired from the instructor's interview, which indicated that there was interest shown in wanting to learn more about Women in American History. She attributed these observations to students' participation in playing the games and participating in the game content development tasks. During the focus groups, the designer, assessed *relevance* to the learners' in terms of how they perceived use of game playing online as part of higher education courses. The majority of focus group members thought that it was a good idea to include games and that they were good for reviewing class material, an important and relevant part of student study actions. Also during the usability testing observation of the games, the designer assessed learners' confidence levels by observing learners play the games about Women in American History without assistance and gathering learners' own self-evaluations of their competence in playing the games from the usability surveys. Those games that were easy to figure out how to play boosted learner's confidence level in comparison to those that was not easy to figure out. These distinctions helped the designer discern what aspects of the games needed revisions. Data gathered on the Usability Surveys verified that less than half of the learners' were not satisfied overall with the games, however *satisfaction* with the game-based motivation strategy was deduced from students' successful completion of the game content development tasks so that new games were developed and played by students during the course.

The game playing component has potential to be a mainstay in future WIAH courses as this activity has capacity to aid learners in achieving learning objectives and meeting learner's overall satisfaction. The game content development activity has capacity to assist learners to achieve higher order learning skills objectives as long as the games used provide learners with more control of the game content. The students' suggestions for improvement were primarily concerned with the game formats that were used. However, some students' recommendations could not be easily implemented because of the games' template designs and constraints of the eGame Generator.

Recommendations

Student Recommendations

1. On those games where answers are typed in, make it possible to just click on answers and have them appear in boxes instead.
2. When the pause button is clicked, keep the game board visible.
3. Losing points would make the games more interesting instead of gaining points.
4. Add more visuals and sound effects.
5. Add a control to change game colors.
6. Design the games without character limitations.
7. Extend the play time in the games.
8. Come up with more games.

Instructor Recommendations

1. Have the game scores feed right into WebCT grades so that they would be part of students' records.

2. Continue making more games to play as examples to help students get ready to make up a game.

3. Pay someone or get the multimedia department involved and have support from the instructor in that department to help manage the game input process and game uploads to the website.

Designer Recommendations

This project accomplished the goal of assessing adult learners' attitudes about game playing and game content development as part of a higher education hybrid learning experience. Based on comments from the instructor, members of the focus groups, and direct observations during the game usability tests, the designer presents the following recommendations.

Though financial resources and time was a limitation for this project, they do not have to be a hindrance to implementing this or a similar game-based motivation strategy in the WIAH course at Butte College. Given the findings, the designer believes it would be worth paying a one-time fee to have four customized game templates developed that had increased flexibility or capacity for manipulating content, adding media, and altering the appearance of their game interfaces. This could be worked out with Carson Media Learning Services since they also do customized games for academic institutions as well as business enterprises. The designer recommends that the templates should be created for easy integration into a content management system, such as WebCT so that

instructors would have the option of tracking game-play as part of students' overall performance in the course. Game templates should be accessible to students from within WebCT so that they can choose the game template of their choice as well as develop their own game questions and answers right inside the game. This would replace the paper-pencil steps associated with the Game Content Development Forms and allow game content development to take place online in the WebCT environment. The games should each have a print feature before the final version is exported so that questions and answers entered in the game may be printed to facilitate copy editing by the instructor and the students. The students would still meet in and or outside of class in small groups to discuss and reflect on the women from American history that they selected. The Content Review Sheet could be replaced by an online version and submitted to the instructor through WebCT as well.

For a lower or non-cost approach, the designer recommends implementing some of the ideas that were discussed with the instructor. Butte College has a very good Multimedia Department. Incorporating game development in their advance level classes specifically for the Women in American History course, would provide students in the Multimedia Department an authentic project; developing four different game templates in one semester. With guidance from other professional staff in the Multimedia and IT Departments, the game templates could be made available to the WebCT content management environment for both the WIAH instructor and students. WIAH students in the following semester would have access to these games to do the game content development assignments. In addition, if there were technical issues with the games, the Multimedia Department would be available to consult and work out the problems.

Following through with either of these two recommendations could open the door down the road to efficient development of complex game simulations that would require increased higher-level thinking from the students, which is an important goal of most instructors. Also on a broader scale, the Game-based Motivation Strategy or variations of it has potential for implementation by other hybrid-delivered disciplines at Butte College or even other Colleges in California or the nation interested in novel ways to address motivation issues in the online learning environment.

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APPENDIX A

Table 1.

Affective Performance Objectives

#	Condition	Objectives	Standard	Measurement
1	Given a Post-Game Development and Game Playing Questionnaire,	learners will be able to indicate their feelings about online learning	according to the response that best reflects the learners' feelings.	3 items – Likert Scale 1 item –Semantic Differential
2	Given a Post-Game Development and Game Playing Questionnaire,	learners will be able to indicate their feelings about playing games as motivation for longer engagement with the course subject,	according to the response that best reflects the learners' feelings.	1 item – Likert Scale
3	Given a Post-Game Development and Game Playing Questionnaire,	learners will be able to indicate their feelings about the design and function of the games,	according to the response that best reflects the learners' feelings.	2 items – Likert Scale 1 item – Ranking Order 1 item – Multiple Choice 1 item – Open Ended Question
4	Given a Post-Game Development and Game Playing Questionnaire,	learners will be able to indicate their feelings about the games as assessment tools to prepare for quizzes and exams,	according to the response that best reflects the learners' feelings.	3 items – Likert Scale 1 item – Multiple Choice 1 item – Yes /No Question

Table 1. (Continued)

#	Condition	Objectives	Standard	Measurement
5	Given a Post-Game Development and Game Playing Questionnaire,	learners will be able to list additional feelings about other ways they prepared for quizzes and exams,	according to the response that best reflects the learners' feelings.	1 item – Open Ended Question
6	Given a Post-Game Development and Game Playing Questionnaire,	learners will be able to indicate their feelings about the game content development tasks,	according to the response that best reflects the learners' feelings.	3 items – Likert Scale 1 item – Semantic Differential
7	Given a Post-Game Development and Game Playing Questionnaire,	learners will be able to indicate their perceived knowledge from the games' content and its impact on their final exam performance,	according to the response that best reflects the learners' feelings.	1 item – Likert Scale

Table 2.

Cognitive Performance Objective

#	Condition	Objective	Standard	Measurement
1	Given a Post-Game Development and Game Playing Questionnaire,	learners will be able to recognize three facts from the games' content	by choosing the correct answer.	3 items – True/ False Statement

Table 3.

Correlation of Gagne's Events to Framegames' Instructional Strategies

	Gagne's Nine Instructional Events	Framegames' Built-in Instructional Strategies
1	Capture the attention of the learner	Course content presented in four game tactics to introduce a change in stimulus.
2	Describe to learners what performance objectives are to be achieved	Game interfaces begin with written descriptions that inform learners of the game rules and solutions expected.
3	Help learners recall prerequisite learning	Each game contains familiar playing tactics that stimulate prerequisite game-playing skills. Each game is also designed with questions that stimulate recall of material learned in previous game levels and in the classroom.
4	Present instruction to facilitate the learner's achievement of performance objectives.	Game's instruction and interface are arranged to direct learners to meet the goals of the games.
5	Guide the learners through the material so they begin to meet the objectives	Game details are accessible at any time during the game for help. Solution hints are given on the more challenging game types that have short answers.
6	Prompt the performance	Each game contains a structure and set of queries that prompt learners to provide solutions.
7	Give feedback to the learners	Games include colors, motion, and sounds indicating right and wrong answers, and a timer that counts down the seconds. Duration shortens the higher the level one goes.
8	Evaluate how well the learners are beginning to achieve the objectives	At the end of each game, learners see his or her point score indicating the number of correct items achieved in the game.
9	Work toward helping the learners retain what they have learned and apply it	The game content is linked to material presented in the classroom. Learners are given opportunities to grapple with related content in other course assignments and integrate what they have retained from playing the games.

Table 4.

Romiszowski's Four-Step Process for Guided-Discovery Strategy

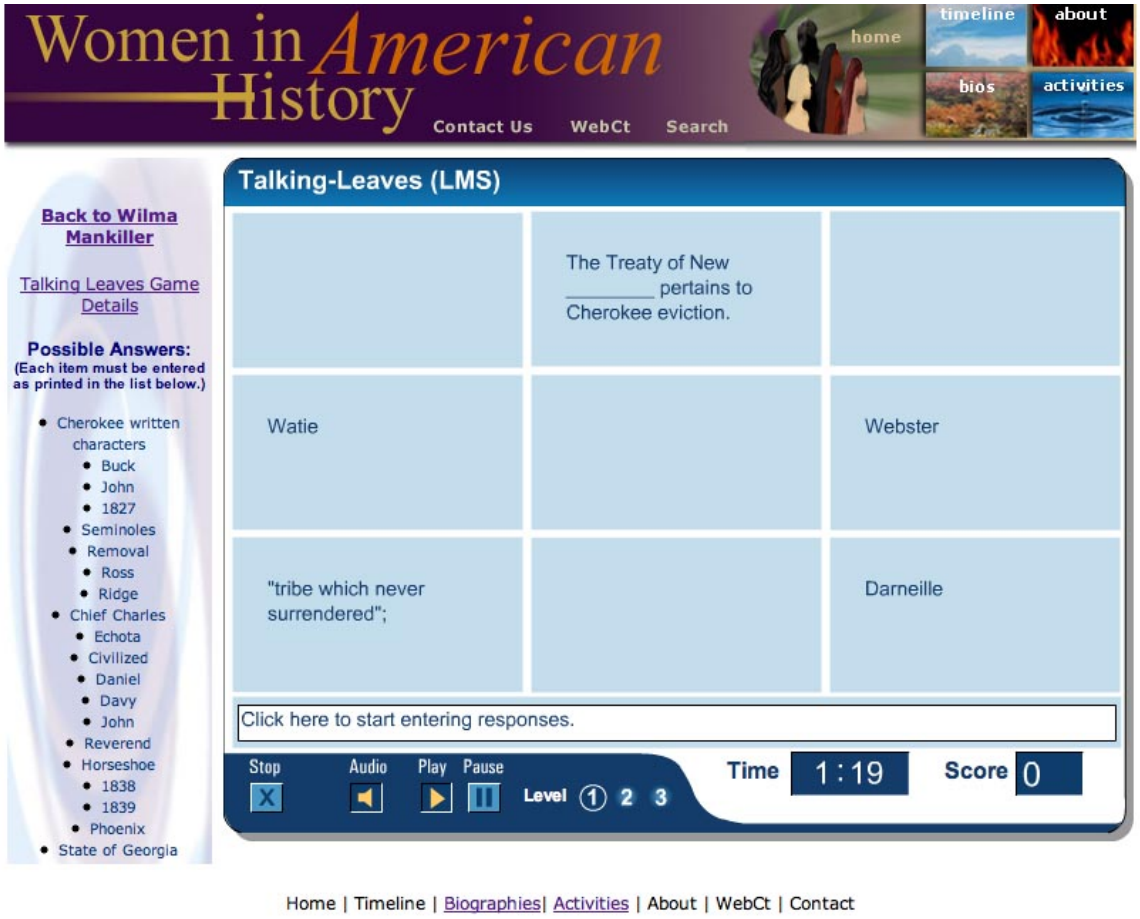
Four-Step Process	**Game Content Development Tasks Conducted by Instructor**
1. Structure opportunities for learners to receive important experiences and observe or reflect on them.	A. Have students form groups of three based on the "Woman of interest" in American History that she/he selected from a list provided by the class instructor. B. According to the instructor's guidelines, have members of each group read different sources and reflect on the life of that woman. (on own outside of classroom)
2. Question the learners about the experiences and observe learners reactions	A. Using a content development form, have individual members of each group compose 20 questions about the life of the selected woman according to a game template selected by the student. (on own outside of classroom) B. Have each student center their questions on a theme (e.g. heritage, politics, work, etc.) as it relates to the woman. C. Have students discuss answers to the questions in groups so learners may compare their findings about the woman and observe one another's reactions. (in classroom)
3. Help learners think about the general principles and significant emotional experiences they have experienced	Encourage members of each group to discuss significant emotional experiences they've felt either when researching, developing questions, or reading stories about the woman's life (in classroom).
4. Structure opportunities for learners to apply what they have learned to actual situations and problems.	Have the members of each group review game Q and A to allow students multiple perspectives about the selected woman and to apply what they have learned from their own research by solving the game questions.

Table 5.

Design Document to Guide Component Creations of the Game-based Motivation Strategy

Game-based Motivation Strategy Design	
Objectives Given a post-game development and game-play questionnaire,	**Components to Create**
Instructional Strategy One: Game-playing (online)	
Affective 1. learners will be able to indicate their feelings about online learning. 2. learners will be able to indicate their feelings about playing games as motivation for longer engagement with the course subject. 3. learners will be able to indicate their feelings about the design and function of the games. 4. learners will be able to indicate their feelings about the games as assessment tools to prepare for quizzes and exams. 5. learners will be able to list additional feelings about other ways they prepared for quizzes and exams. 6. learners will be able to indicate their perceived knowledge from the games' content and its impact on their final exam performance Cognitive learners will be able to recall three facts from the games' content.	1. 4 Sample Games 2. 15 Preliminary Games
Instructional Strategy Two: Game-Content Development (offline)	
Affective Learners will be able to indicate their feelings about the game content development tasks.	1. 4 Game Content Development Forms 2. 1 Game Content Review Sheet

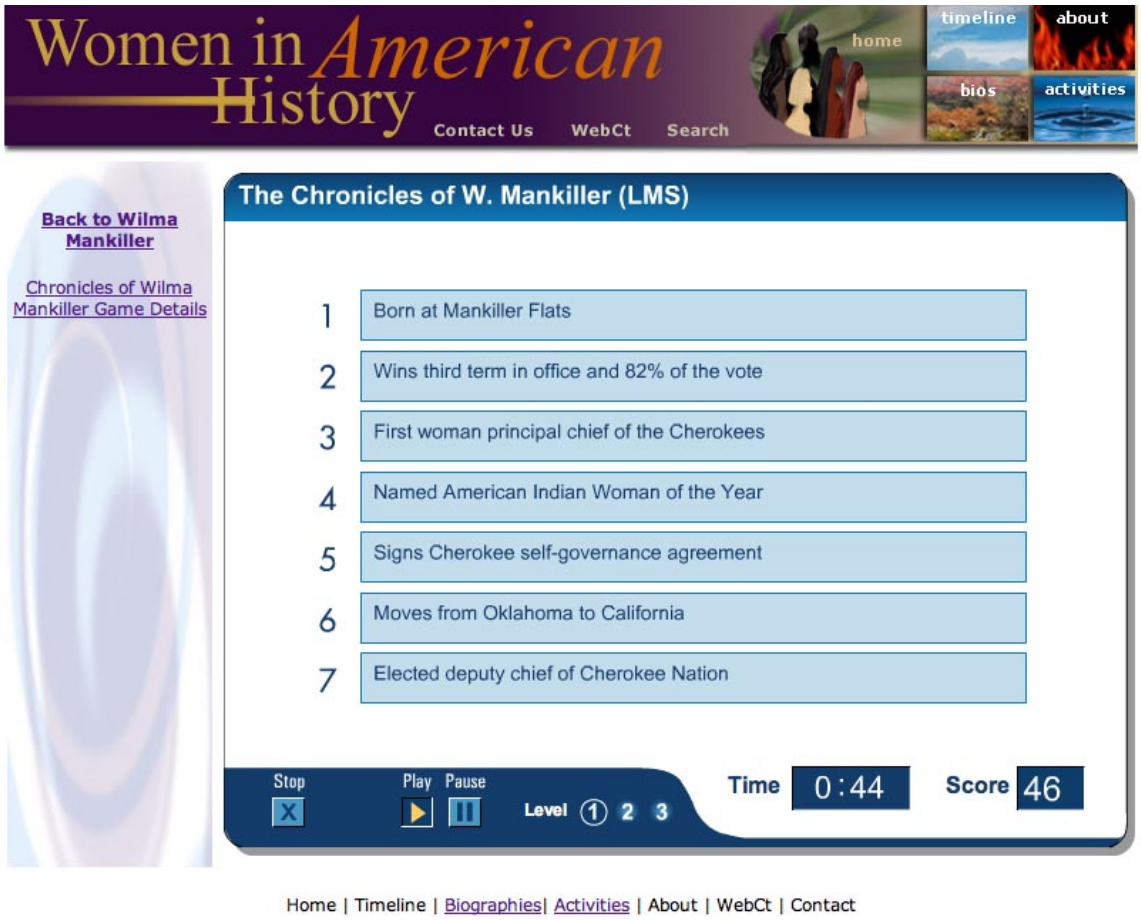
APPENDIX B



Sample 1: Talking Leaves (Sample Mankiller Game from Pop It! Template)

Sample 2: Chief Connections (Sample Mankiller Game from Connect It! Template)

Sample 3: Heritage Ties (Sample Mankiller Game from Pair It! Template)



Sample 4: Chronicles of Wilma Mankiller (Sample Game from Order It! Template)

APPENDIX C

GROUP PHOTOS and GAME RECORD

Game Content Development Group #: _____ Photo Date_______		
Name of featured woman:		Names of group members as they appear left to right in photo:
Game Title	Format	
		1
		2
		3
		4

Game Content Development Group #: _____ Photo Date_______		
Name of featured woman:		Names of group members as they appear left to right in photo:
Game Title	Format	
		1
		2
		3
		4

Game Content Development Group #: _____ Photo Date_______		
Name of featured woman:		Names of group members as they appear left to right in photo:
Game Title	Format	
		1
		2
		3
		4

BATTLING BELLA _PRINT COPY Content Developer Name _____ Date_____

Please review the following questions/answers and compare with your Game Content Development Form.

1. Question: [Where Bella was born] <-> Answer: [Bronx New York]
2. Question: [Year Bella was born] <-> Answer: [1920]
3. Question: [Learned complicated Hebrew prayer at age] <-> Answer: [seven]
4. Question: [Name of Bella's father's butcher shop] <-> Answer: [Live and let live]
5. Question: [How old Bella was when her father died] <-> Answer: [13]
6. Question: [What musical instrument did Bella like to play best] <-> Answer: [mandolin]
7. Question: [Law school Bella graduated from] <-> Answer: [Columbia]
8. Question: [Strontium 90 caused what in children] <-> Answer: [leukemia]
9. Question: [Bella married Martin Abzug in this year] <-> Answer: [1944]
10. Question: [What WSP stands for] <-> Answer: [Women's Strike for Peace]
11. Question: [Why Bella started wearing hats] <-> Answer: [women's sign of professionalism]
12. Question: [What Bella told the 4th world conference on women] <-> Answer: [Never hesitate to tell the truth. Never give in or give up.]
13. Question: [Case Bella was working on when she had miscarriage] <-> Answer: [Willie McGee]
14. Question: [How old Bella was when she ran for congress] <-> Answer: [fifty]
15. Question: [This woman's place is in the house] <-> Answer: [Bella's campaign slogan]
16. Question: [What happened to Bella in race for the Senate in 1976] <-> Answer: [lost]
17. Question: [In 1990 what group Bella co-founded] <-> Answer: [WEDO]
18. Question: [Foreign policy group co-founded by Bella] <-> Answer: [Women USA]
19. Question: [Underwent surgery that led to her death] <-> Answer: [heart]
20. Question: [Year of Bella's death] <-> Answer: [1998]

APPENDIX D

Clearance Letter for Human Subjects in Research

California State University, Chico
Chico, California 95929-0875
School of Graduate, International, and Interdisciplinary Studies
Phone: 530-898-6880
Fax: 530-898-6889

December 5, 2005

Andreina McPherson-Shelton
2055 Amanda Way, #4
Chic0, CA 95928

Dear Andreina McPherson-Shelton,

As the Chair of the Campus Institutional Review Board, I have determined that your research proposal entitled "DEVELOPMENT OF WEB-BASED GAMES FOR A COMMUNITY COLLEGE COURSE"is exempt from full committee review. This clearance allows you to proceed with your study.

I do ask that you notify our office should there be any further modifications to, or complications arising from or within, the study. In addition, should this project continue longer than the authorized date, you will need to apply for an extension from our office. When your data collection is complete, you will need to turn in the attached Post Data Collection Report for final approval. Students should be aware that failure to comply with any HSRC requirements will delay graduation. If you should have any questions regarding this clearance, please do not hesitate to contact me.

Sincerely,

John Mahoney, Ph.D., Chair
Human Subjects in Research Committee

Attachment: Post Data Collection Report

cc: Tom Welsh (502)

The California State University

INFORMED CONSENT FORM Games Usability Test

Designer Contact Info:

Name: Andreina McPherson-Shelton
Phone: _____
Email: _____

Thank you for agreeing to participate in this instructional design research project, which has been in effect since February 1, 2006 and will continue to May 1, 2006. This form outlines the purpose of the project and provides a description of your involvement and rights as a participant.

The purpose of this project is to develop and evaluate four types of web-based games to improve the online instructional component for the Butte Community College Course titled "Women in American History."

In this Usability Test you will be asked to complete a survey after I have observed you playing four trial games. It will take approximately 40 minutes to play the games and complete the survey.

From this information, I will write an evaluation report about the game product, game development process, and your perceptions of both. The evaluation report will be read by the course instructor and by two other persons in order to check on the accuracy of the report. You are encouraged to ask any questions at any time about the nature of the project and the methods that I am using. Your suggestions and concerns are important to me; please contact me at any time at the phone number or email address listed above.

I guarantee that the following conditions will be met:

1) Your name will not be used at any point of information collection, or in the evaluation report.

2) Your participation is voluntary; you have the right to not participate in the usability test and survey without penalty or reprisal.

I agree to the terms: Respondent's signature _____ Date _____

I agree to the terms: Designer's signature _____Date _____

INFORMED CONSENT FORM Game Development, Game Playing, Focus Group

Designer Contact Info:

Name: Andreina McPherson-Shelton
Phone: _____
Email: _____

Thank you for agreeing to participate in this research project, which has been in effect since February 1, 2006 and will continue to May 1, 2006. This form outlines the purpose of the research project and provides a description of your involvement and rights as a participant.

The purpose of this project is to develop and evaluate four types of web-based games to improve the online instructional component for the Butte Community College Course titled "Women in American History."

In this two-part assessment you will be asked about your perspectives on playing games and developing content for games. It will be conducted as follows:

1. Post-Game Development and Game Playing Questionnaire (approx. 15 min.)
2. Focus Group Interview (approx. 30 min,)

From this information, I will write an evaluation report about the game product, game development process, and your perceptions of both. The evaluation report will be read by the course instructor and by two other persons in order to check on the accuracy of the report. You are encouraged to ask any questions at any time about the nature of the project and the methods that I am using. Your suggestions and concerns are important to me; please contact me at any time at the phone number or email address listed above. I guarantee that the following conditions will be met:

1) Your name will not be used at any point of information collection, or in the evaluation report.
2) If you grant permission for audio taping, no audio tapes will be played for any reason other than to do this study, and thereafter will be destroyed.
3) Your participation in this project is voluntary; you have the right to withdraw from the focus group at any time without penalty or reprisal.

I grant permission to be audio taped? Yes _____ No _____

I agree to the terms: Respondent's signature _____ Date _____

I agree to the terms: Investigator's signature _____Date _____

INFORMED CONSENT FORM Game Playing and Focus Group

Designer Contact Info:

Name: Andreina McPherson-Shelton
Phone: _____
Email: _____

Thank you for agreeing to participate in this research project, which has been in effect since February 1, 2006 and will continue to May 1, 2006. This form outlines the purpose of the research project and provides a description of your involvement and rights as a participant.

The purpose of this project is to develop and evaluate four types of web-based games to improve the online instructional component for the Butte Community College Course titled "Women in American History."

In this two-part assessment you will be asked about your perspectives on playing games, which will be conducted as follows:

3. Play a series of four different game types (approx. 15 min.)
4. Focus Group Interview (approx. 30 min,)

From this information, I will write an evaluation report about the game product, game development process, and your perceptions of both. The evaluation report will be read by the course instructor and by two other persons in order to check on the accuracy of the report. You are encouraged to ask any questions at any time about the nature of the project and the methods that I am using. Your suggestions and concerns are important to me; please contact me at any time at the phone number or email address listed above. I guarantee that the following conditions will be met:

1) Your name will not be used at any point of information collection, or in the evaluation report.
2) If you grant permission for audio taping, no audio tapes will be played for any reason other than to do this study, and thereafter will be destroyed.
4) Your participation in this project is voluntary; you have the right to withdraw from the focus group at any time without penalty or reprisal.

I grant permission to be audio taped? Yes _____ No _____

I agree to the terms: Respondent's signature _____ Date_____

I agree to the terms: Investigator's signature _____ Date _____

Andreina Shelton
California State University, Chico

Sign-up Sheet for Game Usability Test

SIGN UP SHEET
Women in American History - Project

The purpose of this project is to develop and evaluate four types of web-based games to improve the online instructional component for the Butte Community College Course titled “Women in American History.”

You will be asked to participate in a game usability test, which will take approximately 40 minutes. The test is scheduled Friday, April 14, 2006 on the Butte College main campus in the Learning Resource Center, Lab room 118, at 12:15 pm.

If you wish to participate in this usability test, please sign up below:

	Name
1	
2	
3	
4	
5	

Thank you for volunteering.

Andreina Shelton
California State University, Chico

Game Playing and Focus Group Sign-up Sheet

SIGN UP SHEET
Women in American History - Project

The purpose of this project is to develop and evaluate four types of web-based games to improve the online instructional component for the Butte Community College Course titled "Women in American History."

You will be playing games and participating in a focus group, which will take approximately 45 minutes. This assessment is scheduled Friday, April 28, 2006 on the Butte College main campus in the Learning Resource Center, Lab room 118, at 12:15 pm.

NOTE: If you have them, please bring a set of headphones to use in the Lab.

If you wish to participate please sign up below:

	Name
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Thank you for volunteering.

APPENDIX E

USABILITY TESTING OBSERVATIONS For Game Type:_____

Thank you for participating in this usability test. I am developing web-based games for the online component of the Women in American History course at Butte College. You will be testing four different game types. You will be given specific directions and then observations will be made about your responses. You will not be provided answers. The content of two of these games are based on subject matter you were assigned or that was discussed in your Women in American History class. It is not important that you get every item correct. Do the best you can. It will take approx. 6 minutes to do six tasks followed by four minutes to complete a survey for each game.

Observer Script to direct User Tasks	User: A, B or C, D	Assistance ?	Time	Observations
1. Please click on the Trial Games link.				
The Trial Games page appear				
2. Next, click on the _____ game link under the column _____ to launch the game.				
3. Please wait for the game to load. Then read the game instructions.				
4. If more explanation is needed, you may click on the link for Game Details in the left navigation bar at any time during the game.				
5. You may begin playing the game at Level 1. **NOTE:** ***When first "Game Over" appears on screen, direct Users to click the Stop button.***				
6. Please click on link in upper left corner to go back to the Trial Games page.				

USABILITY SURVEY

Web-based Games

Thank you for your participation. Your honesty in answering items on this survey will help us enhance the web-based games designed for the "Women in American History" course.

Game Name: _____

Game Type: _____

Instructions: *Please rate how strongly you agree or disagree with each of the following statements by placing a check mark in the appropriate box.*

1. **The game design is organized.**

☐ Strongly Disagree ☐ Somewhat Disagree ☐ Somewhat Agree ☐ Strongly Agree

2. **The instructions were easy to follow.**

☐ Strongly Disagree ☐ Somewhat Disagree ☐ Somewhat Agree ☐ Strongly Agree

3. **I was able to navigate through the game with ease.**

☐ Strongly Disagree ☐ Somewhat Disagree ☐ Somewhat Agree ☐ Strongly Agree

4. **It was easy to use the game controls – "Play," "Stop," "Pause," and "Exit."**

☐ Strongly Disagree ☐ Somewhat Disagree ☐ Somewhat Agree ☐ Strongly Agree

5. The game loaded quickly.

☐ Strongly Disagree ☐ Somewhat Disagree ☐ Somewhat Agree ☐ Strongly Agree

6. The game was challenging.

☐ Strongly Disagree ☐ Somewhat Disagree ☐ Somewhat Agree ☐ Strongly Agree

7. The hints (if included in this game) were helpful.

☐ Strongly Disagree ☐ Somewhat Disagree ☐ Somewhat Agree ☐ Strongly Agree

8. The color design of the game's interface distracted me when I played the game.

☐ Strongly Disagree ☐ Somewhat Disagree ☐ Somewhat Agree ☐ Strongly Agree

9. The sound effects were useful when playing the game.

☐ Strongly Disagree ☐ Somewhat Disagree ☐ Somewhat Agree ☐ Strongly Agree

10. I liked the overall pace of the game.

☐ Strongly Disagree ☐ Somewhat Disagree ☐ Somewhat Agree ☐ Strongly Agree

11. After playing this game, I believe I have a basic understanding about the woman featured in this game.

☐ Strongly Disagree ☐ Somewhat Disagree ☐ Somewhat Agree ☐ Strongly Agree

12. The game met my expectations.

☐ Strongly Disagree ☐ Somewhat Disagree ☐ Somewhat Agree ☐ Strongly Agree

13. Overall, I was satisfied with the game.

☐ Strongly Disagree ☐ Somewhat Disagree ☐ Somewhat Agree ☐ Strongly Agree

We welcome any comments you may have about this game:

_____
_____
_____
_____
_____
_____

Note: Survey Likert Scale Items are based on a 1-4 rating, i.e. 1= strongly disagree and 4= strongly agree

POST GAME-DEVELOPMENT AND GAME PLAYING QUESTIONNAIRE

The purpose of this questionnaire is to assess your perceptions about the web-based games and the game content development tasks associated with them. Read each statement in the left column and then check one of the responses to the right that best reflects your feelings. **Please be honest in your responses as this will help improve the quality of the games.** Thank you for your cooperation!

	Question	Strongly disagree	Disagree	Agree	Strongly agree
1	When playing the games, I found the game instructions to be helpful.				
2	It was easy to gauge my progress using the games' scores while playing each game.				
3	Playing the games helped me recall significant facts and events about the women I studied in this course.				
4	I was motivated to read more about women in American history after playing the games.				
5	Playing the games helped me prepare for course quizzes or exams.				
6	I believe I know enough about the women I played games for to perform well on the final exam.				
7	I found it difficult to use the games as an assessment of my progress in this course.				
8	Playing the games made my online learning experience more interesting.				
9	I believe my group developed questions and answers for games according to the instructor's standards.				
10	I believe I entered data into the Game Content Development Form according to the instructor's standards.				
11	Developing content for the games helped me reflect on experiences of the woman I was researching.				
12	I like taking courses online.				
13	I prefer online courses to courses offered in classroom settings.				

Post Questionnaire (Continued)

Rate *how you feel about the following statements by placing an* ***X*** *on one of the seven spaces provided for each statement.* ***Important!*** *Please check boxes at right for each response you don't understand.*

Example: 1. The art class was . . .
beneficial __ __ __ x __ __ __ useless ☐
easy __ __ __ __ x __ __ challenging ☐

14. I believe playing games online are . . .

Good ____ ____ ____ ____ ____ ____ ____ Bad ☐

Dull ____ ____ ____ ____ ____ ____ ____ Exciting ☐

Harmful ____ ____ ____ ____ ____ ____ ____ Harmless ☐

Wise ____ ____ ____ ____ ____ ____ ____ Foolish ☐

15. When participating in the game content development tasks, I found them to be. . .

A waste of time ____ ____ ____ ____ ____ ____ ____ Worthwhile ☐

Boring ____ ____ ____ ____ ____ ____ ____ Interesting ☐

Easy ____ ____ ____ ____ ____ ____ ____ Challenging ☐

Instructive ____ ____ ____ ____ ____ ____ ____ Useless ☐

Rank *the following responses to each statement below on a scale of 1-4 by numbering each response from most favorable (1) to least favorable (4).*

Example: What would be your favorite beverage?

3 Soda
2 Alcohol
1 Coffee
4 Tea

16. Which is your favorite game? Rank the following game types.
(1 = most favorite, 4 = least favorite)
_____ Connect It! (tic, tac, toe)
_____ Pair It! (matching)
_____ Order It! (ranking order)
_____ Pop It! (short answer)

Post Questionnaire (Continued)

Circle *the answer that best summarizes your actions:*

17. How often did you play any of the games to prepare for quizzes and exams?
    a. Once
    b. Twice
    c. Three times
    d. More than 3 times

18. When you played any of the games, on average how many levels did you complete?
    a. All three levels
    b. Levels 2 and 3
    c. Levels 1 and 2
    d. Level 1 only

19. I only relied on playing the games to prepare for a quiz or exam? yes no

State *briefly your response to the questions below:*

20. What other ways did you review the course material to prepare for quizzes or exams?

    _____

    _____

21. What improvements would you make in the games you played?

    _____

    _____

The following statements assess your recall of information from playing or developing the games. Please circle ***True*** *or* ***False*** *after each item.*

22. Helen Keller became a member of the Socialist Party of Massachusetts. **True False**

23. Elizabeth Cady Stanton helped found the National Women's Political Caucus. **True False**

24. Harriet Tubman was a conductor for the Underground Railroad organization. **True False**

Check *the appropriate spaces below:*

- o I am: female__ male___
- o My age is: 15-24___ 25-34___ 35-44___ 45-54___ 55-64___ 65-74__

Please return the completed questionnaire to the evaluator.

FOCUS GROUP INTERVIEW QUESTIONS

I will be asking questions to collect information on your perspectives about certain aspects of game playing and game development.

1. How many of you like to play some sort of games outside of school?

2. Of those who like to play games, what types of games do you play?

For example: card games, board games, video games, computer games, or massive player online games, etc.

3. What do you like about _____ games?

4. How do you compare the Women in American History games with the games you play outside of school?

5. What did you like about the Women in American History games?

6. What did you not like about the Women in American History games?

7. Some of the Women in American History games included a list of hints or possible answers. How did these affect your game playing?

8. What do you think about game playing online as part of higher education courses?

9. What would you improve in the games? What changes would you make?

10. How did you feel about developing the content for the Women in American History games?

11. Do you think your recall of information in the Women in American History course was better having participated in developing content for the games?

FOCUS GROUP OBSERVATIONS

Location: _____

WIAH Course – Butte College
Topic: Game Playing/Content Development

Observer: _____
Date: _____

1. How many in the focus group? _____

2. How many males?_____

3. How many females?_____

4. What is the ethnic make-up of the group?

_____

_____

5. Does the group as a whole appear to be attentive to the interview?

_____

_____

6. Does the group as a whole seem interested in the topic?

_____

_____

7. Does there appear to be a consensus among the majority on how they feel about game playing in higher education?

_____

_____

8. What percentage of the total group seem to feel strongly about <u>not</u> playing games?

_____

_____

9. What seems to be the overall feeling of the group toward game playing?

_____

_____

Focus Observations (Continued)

10. Is there anyone in the group that appears out of place? bored? overwhelmed? paranoid? or anxious about the topic of game playing or game content development?

_____

_____

11. Did everyone participate? What percentage did not?

_____

_____

12. Does the tone of the group as a whole appear to be reserved or out-going in their attitudes about game playing and game content development?

_____

_____

Other Observations: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

INSTRUCTOR INTERVIEW QUESTIONS

1. What were your reasons for adding games to your course History 28: Women in American History?

2. How did your students in History 28 (at Butte College Chico campus) feel about playing the web-based games overall?

3. What percentage of students do you think played the games to prepare for quizzes and exams?

4. Do you think playing the games helped students assess their own knowledge of the course content? If so, how could you tell?

5. How did your students feel about participating in the game content development tasks in class?

6. How did the game content development tasks impact delivery of your class instruction? How could this process be improved for you as instructor? For the students?

7. Was there a difference between midterm exam scores (when game content development tasks were not yet implemented) and final exam scores (when game content development tasks were implemented)?

Instructor Questions (Continued)

8. What percentage of students did better on their final exams than on their midterm exams?

9. Could you tell from student's work and class discussions at the end of the course if there was an increase in appreciation for the subject matter as opposed to the beginning of the course?

10. Do you think playing the games and participating in the game content development tasks motivated your students to want to learn more about the subject matter?

11. What recommendations would you make to improve online game playing as a support to your class lectures and as it relates to your teaching strategies?

12. If an instructional guide was provided on how to conduct the implementation of the game content development tasks in your classroom, would you consider using it as one of your teaching strategies? Why or why not?

Other comments:

APPENDIX F

DATA COLLECTION TIMELINE FOR FORMATIVE EVALUATION

OF GAME-BASED MOTIVATION STRATEGY

Women in American History Course

Butte Community College

Week	Class Activity (Designer in WIAH Class)	Data Collection Activity	Assessment Instrument
1 Jan 23-27	*Wednesday* 1. Introduce WIAH course (instructor) 2. Play overview game "Women's History IQ" (instructor and designer) 3. Introduce project and evaluation activities (designer)		
2 Jan 30 - Feb 3	*Wednesday* 1. Lecture focused on Abzug and assignments given (instructor) 2. Introduce **1st instructional strategy** - **game playing** and the website with preliminary games (designer)		
3 Feb 6-10	*Wednesday* 1. Quiz, lecture focused on Hamer, and assignments given. (instructor) 2. Have students continue game playing of preliminary games on own time. (instructor)		
4 Feb 13-17	*Wednesday* 1. Quiz, lecture focused on Carson, Roosevelt, Paul, and Pocahantas; and assignments given (instructor) 2. Have students continue game playing of preliminary games on own time (instructor)		

Week	Class Activity (Designer in WIAH Class)	Data Collection Activity	Assessment Instrument
5 Feb 20-24	*Wednesday* 1. Lecture focused on Mankiller and assignments given (instructor) 2. Have students continue game playing of preliminary games on own time. (instructor)		
6 Feb 27- Mar 3	*Wednesday* 1. Lecture focused on Hutchinson and Day, and preparation for midterm exam (instructor) 2. Have students continue game playing of preliminary games on own time (instructor)	*Solicit 2-4 volunteers from another WIAH class to do 1st Usability Testing of games on week twelve.* *Solicit 8-10 volunteers from another WIAH class to play games and participate in Focus Group on week fourteen.* *<u>Use Sign Up Sheets.</u>*	
7 Mar 6 -10	Midterm		
8 Mar 13-17	SPRING BREAK	SPRING BREAK	SPRING BREAK
9 Mar 20-24	*Wednesday* 1. Announcements, subject review, and class discussion. (instructor) 2. Brief review of project: timeline, purpose, data-collection methods. (designer).		

Week	Class Activity (Designer in WIAH Class)	Data Collection Activity	Assessment Instrument
	3. Introduce **2nd Instructional Strategy - Game Content Development Activity**; its timeline and criteria. (designer) 4. Move class to computer lab to play Mankiller games and review the four different game formats. (30 min) (instructor) 5. Move back to classroom and have students form groups of 3 (instructor) 6. Have groups choose the woman to be featured in their games from the following list of women (*each group should choose a different woman*): ▪ Helen Keller ▪ Sarah Grimke ▪ E.C. Stanton ▪ Dorothy Day ▪ Anne Hutchinson ▪ Harriet Tubman ▪ Bella Abzug ▪ Wilma Mankiller (instructor) 7. Present the following research assignment and criteria to students: ▪ Research background of the woman selected by your group. Provide sources. ▪ Develop twenty questions with answers about the selected woman. ▪ Fill-in Game Content Development Form ▪ Include citations for game's content source (MLA or APA style) ▪ Due next Wednesday (instructor)		

Week	Class Activity (Designer in WIAH Class)	Data Collection Activity	Assessment Instrument
	8. Have students decide on a game format and pass out corresponding Game Content Development Forms with completed samples ▪ Members of each group should choose different game formats. ▪ One game format per group member (*two if doing the Order it! format*) (instructor) 9. Present instructions for filling in Game Content Development Forms (instructor) 10. Remind students that group pictures will be taken next week .(instructor)		
10 Mar 27-31	*Wednesday* 1. Announcements, subject review, and class discussion. (instructor) 2. Have groups engage in discussion and peer review of completed Game Content Development Forms; then submit to instructor. (instructor) 3. Group pictures taken while groups engaged in peer reviews. (designer)		
11 Apr 3-7	*Outside of classroom:* 1. Submit completed instructor-edited Game Content Development Forms to designer. (instructor)		

Week	Class Activity (Designer in WIAH Class)	Data Collection Activity	Assessment Instrument
	2. Enter new games' content into game generator. (designer) 3. Publish all new games as trial games for Usability Tests. (designer)		
12 Apr 10-14	*Wednesday* 1. Return Content Development Forms with attached game Print Copy to students. (designer) 2. Introduce and explain to students the Content Review Sheet with instructions. (designer) 3. Lecture and class discussion. (instructor) *Friday* 1. Meet with volunteers from another WIAH class in computer lab (1 hour) (designer) 2. Introduce project and overview of evaluation activities (designer) 3. Have participants sign consent forms for participation. (designer) 4. Instruct participants how to access website to play the games. (designer) 5. Have participants complete a Usability Survey. (designer)	1. Conduct usability testing and survey of games' for navigation, design, and function (designer)	1. Usability Observa-tion Chart 2. Usability Survey
13 Apr 17-21	*Outside of classroom:* 1. Collect completed Content Review Sheets and submit to designer (instructor)		

Week	Class Activity (Designer in WIAH Class)	Data Collection Activity	Assessment Instrument
	2. Based on analysis of usability tests, surveys, and completed Content Review Sheets make revisions on trial games in game generator (designer) 3. Upload revisions of games to website. (designer)		
14 Apr 24-28	*Wednesday:* 1. Introduce evaluation activities of the project (designer) 2. Have students sign consent forms for participation (designer) 3. Have students go to computer lab in same building and instruct them how to access the website to play their own games (20 min) (designer) 4. Observe students playing their own games. (designer) 5. Have students go back to classroom (designer) 6. Pass out Post-Game Dev/Playing Questionnaire (designer) 7. When all Questionnaires are received from students, have students form a circle for Focus Group (designer) *Outside of classroom:* 1. Interview instructor about the Game-based Motivational Strategy	1. Conduct evaluation of Game Playing and Content Development Activity (designer) 2. Conduct Focus Group (designer) 1. Conduct follow-up interview (designer)	1. Post-Game Dev/Play-ing Question-naire 2. Focus Group questions, Observa-tion Form, and audio recorder 1. Interview Questions for Instructor

Week	Class Activity (Designer in WIAH Class)	Data Collection Activity	Assessment Instrument
	Friday 1. Meet with volunteers from another WIAH class in computer lab (1-1/2 hours) 2. Introduce project and overview of evaluation activities (designer) 3. Have participants sign consent forms for participation (designer) 4. Instruct participants how to access website to play the games (designer) 5. Observe participants playing their peer's games. (designer) 6. Have participants form a circle for Focus Group	1. Conduct Focus Group (designer)	1. Focus group questions, Observa-tion Form, and audio recorder

APPENDIX G

INTRODUCTION TO THE FORMATIVE EVALUATION
OF THE GAME-BASED MOTIVATION STRATEGY

Script

After completion of the "Women's History IQ," overview game played by students at the start of the WIAH class, the designer will introduce herself and announce herself as a graduate student in the Instructional Design and Technology Program. She will then touch briefly on the following points:

- The purpose of the project is to develop and evaluate a game-based motivation strategy to improve the online instructional component of the Women in American History course. The strategy consists of two main activities in which your class will participate: 1) game-playing, and 2) game content development.

- During this semester students in this class will participate in playing games created by their peers and creating new games according to specific criteria that will be explained later in the semester.

- Content for games will be developed using four game formats:

    a. Tic-Tac-Toe based game – Connect It!
    b. Matching based game – Pair It!
    c. Question-Answer based game – Pop It!
    d. Chronological based game – Order It!

- To determine the success of the game-based motivation strategy, it is necessary to conduct a formative evaluation. When all activities have been completed, you will be asked to complete a questionnaire and participate in a Focus Group, both of which are voluntary.

- From the information collected, a report will be written about your perceptions of the:

    a. Games
    b. Game-playing experience
    c. Game content development process

- The project timeline is February 1, 2006 to May 1, 2006.

SCREEN CAPTURE OF TRIAL GAMES WEB PAGE

APPENDIX H

GAME CONTENT DEVELOPMENT FORM
History 28: Women in American History

SAMPLE

Name of Woman: *Wilma Mankiller*

Game Type: Connect It!
In this game the player chooses a category of knowledge displayed on the game board and then types a short answer to a question about that category of knowledge. With correct answers the user receives an "X" and gains points, with incorrect answers the user receives an "O" and loses points. Like the game Tic-Tac-Toe, the player's task is to correctly answer questions in any three boxes in a straight line.

Game Name: **Chief-Connections**
Create a name for your game. Choose something that refers to the life of the woman that you are developing the question and answer items for.

Cite sources for your content: Refer to an APA or MLA Style Guide.

APA example: Baddeley, A. D. (1999). *Essentials of human memory.* Hove, England: Psychology Press.

MLA example: Nabokov, Vladimir. Lolita. New York: Putnam, 1955.

Number of Items (questions) to include in this game: 20
Develop 10 questions with answers for two categories about the woman you are researching. For example, categories might be "Heritage" and "Historical Events."

Questions:
Design questions and "statements-to-complete" with the appropriate punctuation. For example, use capital letters at the beginning of sentences and periods at the end. Use
Question marks at the end of questions, and use commas to separate dependent and independent clauses. **Do not exceed 260 characters (including spaces) for each question.**

Answers:
There can only be one right answer. Keep answers factual and precise. Avoid descriptive words that are subjective or can be interpreted in more than one way. Brief concept phrases or one word answers are best. Use punctuation only where necessary. For example, capitalize proper nouns but do not use commas or periods. **Do not exceed 260 characters (including spaces) for each answer.**

Game Type: Connect It! Game Name: Chief-Connections SAMPLE continued

1st Category Name: Heritage		
Item #	**Questions (260 Character Limit)**	**Answers (260 Character Limit)**
1	What is the English translation for Asgaya-dihi?	Mankiller
2	Major of Captain were equivalent terms for what old Cherokee title or rank?	Mankiller
3	Who established "Mankiller" as the family surname?	Ka-skun-nee Mankiller
4	The land assigned to Wilma Mankiller's paternal grandfather is now called:	Mankiller Flats
5	In which twentieth century war did Wilma Mankiller's grandfather serve the United States?	World War 1
6	Who did the Cherokee people authorize to sell the Sequoyah Training School and its forty acres to the United States?	Chief W C Rogers
7	Stripping Indian children of their native culture, heritage, and language was the primary mission of what institutions?	Indian Boarding Schools
8	Of what ethnicity is Wilma Mankiller's mother?	Dutch-Irish
9	In what year was Wilma Mankiller born?	1945
10	Who was credited for developing the Cherokee syllabary?	Sequoyah

Game Type: Connect It! Game Name: Chief-Connections SAMPLE continued

2nd Category Name: Historical Events		
Item #	**Questions (260 Character Limit)**	**Answers (260 Character Limit)**
1	Wilma Mankiller's Cherokee ancestors who lived in Georgia, Tennessee, N. Carolina, and Alabama were forced from their homes in the late 1830s by the Federal Government, on what was known as:	Trail of Tears
2	After 1817, Cherokee "Old Settler" families voluntarily immigrated to an area west of the Mississippi known as:	Cherokee Nation West
3	In 1907, what state was created that led to the termination of Indian territory?	Oklahoma
4	Land held in common by the Cherokee nation was parceled out in individual allotments of how many acres per family?	160
5	The General Allotment Act of 1887 is also called:	Dawes Act
6	Which U.S. president supported the termination of tribal land ownership by advocating "a mighty pulver izing engine to break up the tribal mass?"	Theodore Roosevelt
7	In what year were Native Americans considered official citizens of the United States?	1924
8	In 1983, Cherokee Principal, Chief Ross Swimmer asked Wilma Mankiller to run in the election for what position?	Deputy Chief
9	In 1985, Wilma Mankiller of the Cherokee Nation, becomes the first woman to be elected to:	Principal Chief
10	For which of her terms in office did Wilma Mankiller receive 82 percent of the vote?	Third
Content Developers		
1		
2		
3		
4		
5		
Date:		Instructor's Initials:

GAME CONTENT REVIEW SHEET SAMPLE

Instructions

PART I – Your Game Review

1. Please review the Print copy of the game content for the game you developed. It is attached to your edited Content Development Form.

    a. Check for continuity and logical flow between your questions and answers.

    b. Check for spelling, grammar, and punctuation.

    c. On the Print copy, draw a line through any incorrect item. Write the correction underneath the item.

2. Go to the web page containing your game on the WIAH website

    a. Click on the title of your game.

    b. Check the game's title on the game board interface. Is it correct? If not, Please print the incorrect title, that appears on the game board, in the left column and the correct title in the right column in Part I on the following page.

    c. Check the sources listed under the game instructions at the beginning of the game. Are they incorrect or incomplete? If so, please print the incorrect source, which appears on the game board, in the left column and the correct source in the right column in Part I on the following page.

    d. Play your game.

PART II – Your Group Member Game Review

1. Go to the web pages containing games of your group members on the WIAH website

    a. Click on the game title of one other member of your group and play her/his game.

    b. Briefly answer the questions and provide comments about this game in Part II on the following page.

    c. Return Game Content Review Sheet, Game Questions and Answers, and Game Content Development Sheet to your instructor.

Part 1 - Your Game Review	SAMPLE
Your Name:	Game Title:
Incorrect	**Correct**
Title:	Title:
Source 1:	Source 1:
Source 2:	Source 2:
Source 3:	Source 3:
Source 4:	Source 4:

Part II – Your Group Member Game Review		
Group Member's Name:	Game Title:	
The game(s) I played were based on information familiar to me.	Yes	No
Even if I did not know all the answers, the questions presented in the game made sense to me except for the following questions:	Yes	No
1.		
2.		
3.		
Other comments about this game:		

APPENDIX I

SUMMARY OF USER COMMENTS FROM GAME USABILITY SURVEYS

Guerrilla Warfare – Pop It! game format:

1. User A – “Make hints more noticeable, make writing bigger and easier to read, make things easier to see, darker print, larger.”
2. User B – “I don’t think I understood at first exactly how to play, what the goal was, but after a minute, I got it, but by that time the time clock was up, I didn’t even see the hints, but that could have been my fault.”
3. User C – “I really would have loved to have played if I could have figured out how. What I did not understand was if I answered a question, what did I do to answer the next. Other than that, I’m really glad you are developing games that are educational, especially games educating people on women.”
4. User D – “I did not understand how to play the game at first, but after I clicked “Game Details” I understood much better.”

Elizabeth Cady Stantagies – Pair It! game format:

1. User A – “I liked this style of game. Still, make things easier to read, especially the directions. Maybe use a different font.”
2. User B – “It was fun, I liked the pace and the questions were clear and easy to understand.”

Summary of User Comments (Continued)

3. User C – “Even though I had to click to find out further directions on how to play, the game was very easy to figure out. Very fun.”
4. User D – “The instructions for this game were easy to understand and I enjoyed playing this game.”

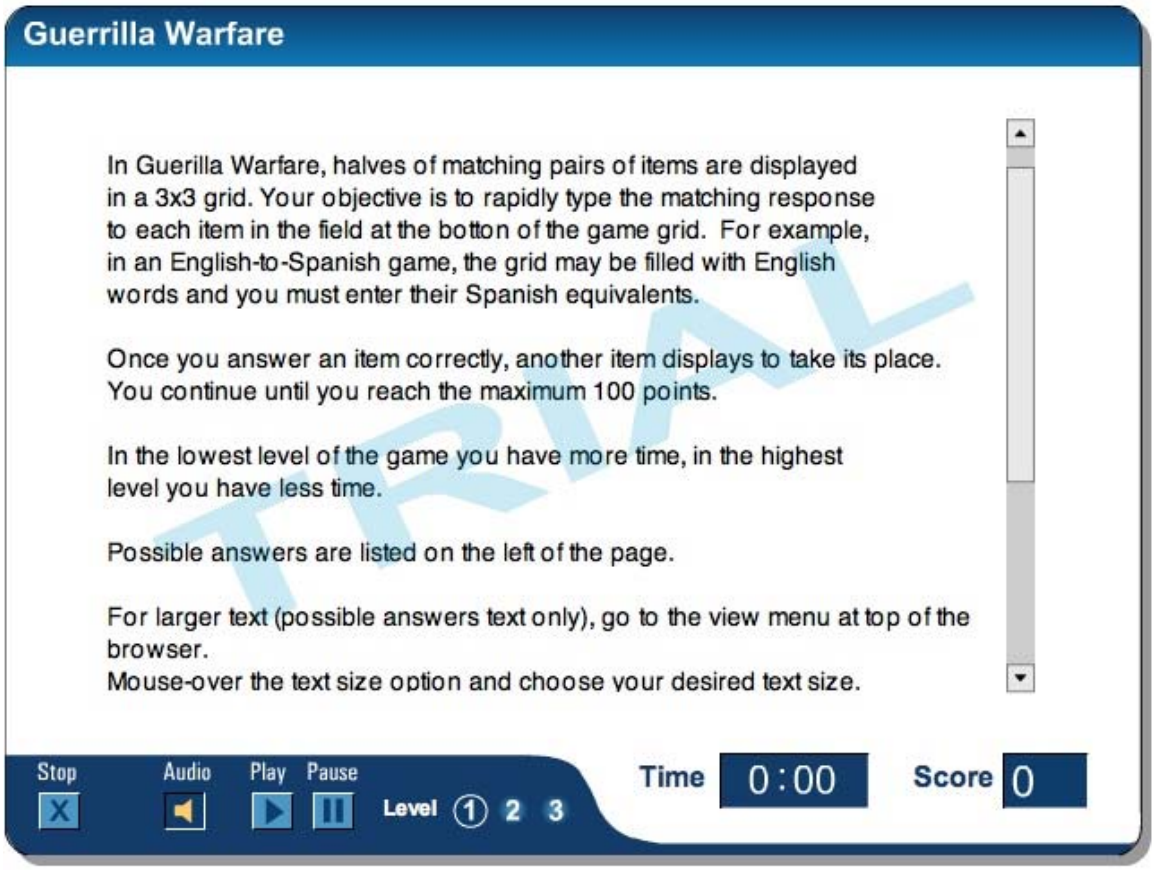
Putting Life in Place: Part I – Order It! game format:

1. User A – “Make directions easier to understand, I didn’t know until it was too late how to organize the statements. Also make directions easier to read, darker or bolder. Make it clear how to move the statements.”
2. User B – “It kept a good pace and was interesting. I think it would be helpful to use when learning about Ms. Keller.”
3. User C – “I really enjoyed playing this game. It took me a few seconds to figure out how to place them in the proper order, but after I figured out how, I had fun!”
4. User D – “I was unsure of how to play this game. I understood that I had to put things in order, but I did not know whether you just clicked on them, or you had to drag the items to put into order. Once I figured out how to play, then it was fun.”

Summary of User Comments (Continued)

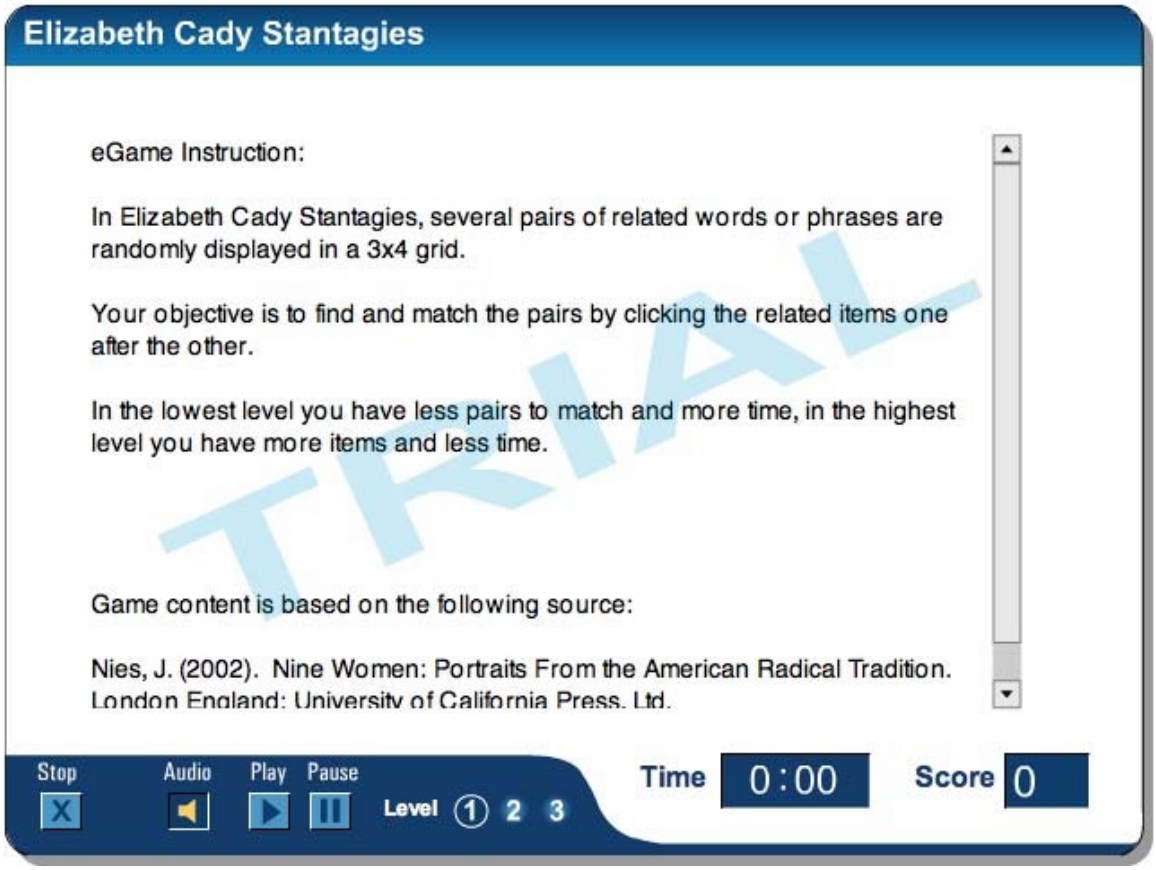
Hats Off to Bella! – Connect It! game format:

1. User A – “You should be able to change the box you are in if you don’t want to answer the question asked. Make directions easier. It was fun but you should not have to stay on the same question if you don’t want to.”
2. User B – “It was a little slow between questions, but besides that, great. I liked the hints because even if you had no clue, you could figure out the answer and learn something.”
3. User C – “Well, I could not figure out what to do after I entered my answer. What was I supposed to click on after I wanted to see whether my answer was wrong or right? I was a bit confused on what to do.”
4. User D – “This game was very easy to follow. Once I found what I wanted in the “hints” section, the game was easier, and went by faster.”



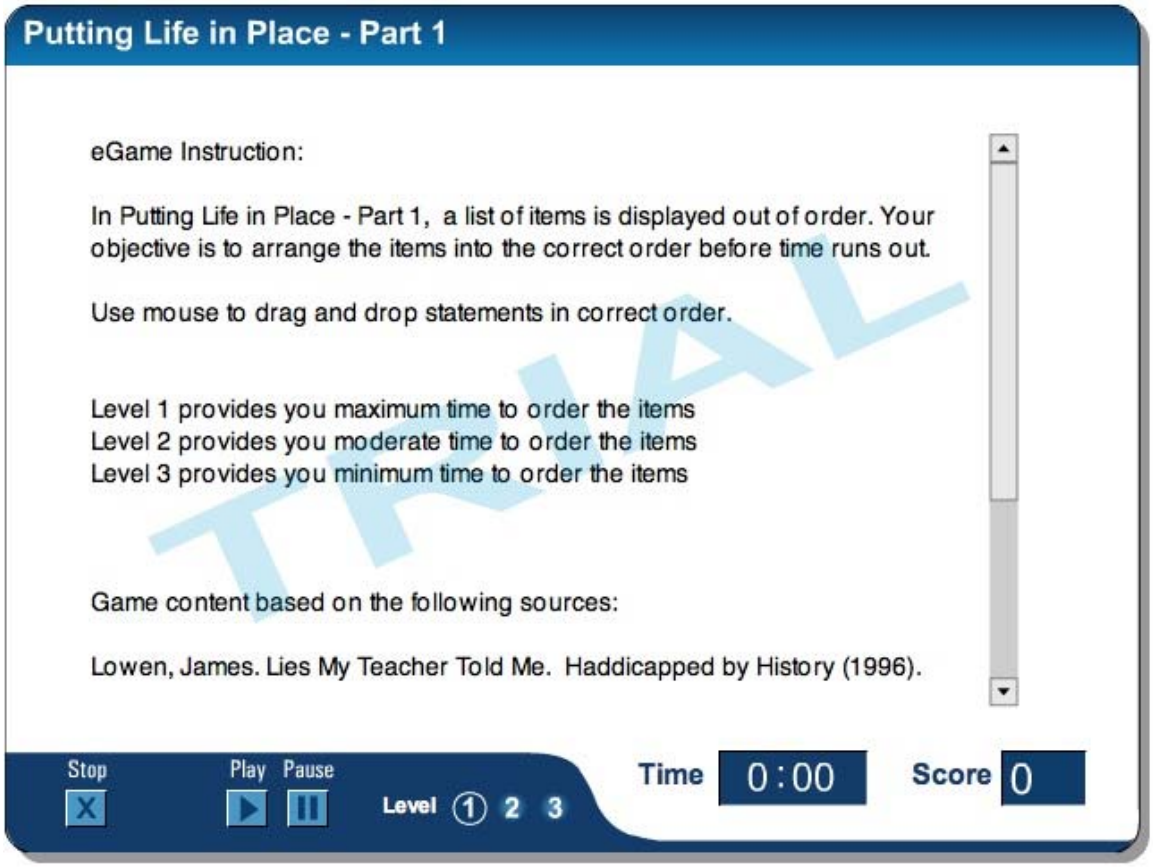
Pop It! Game Format

Instructional Revisions (Continued)



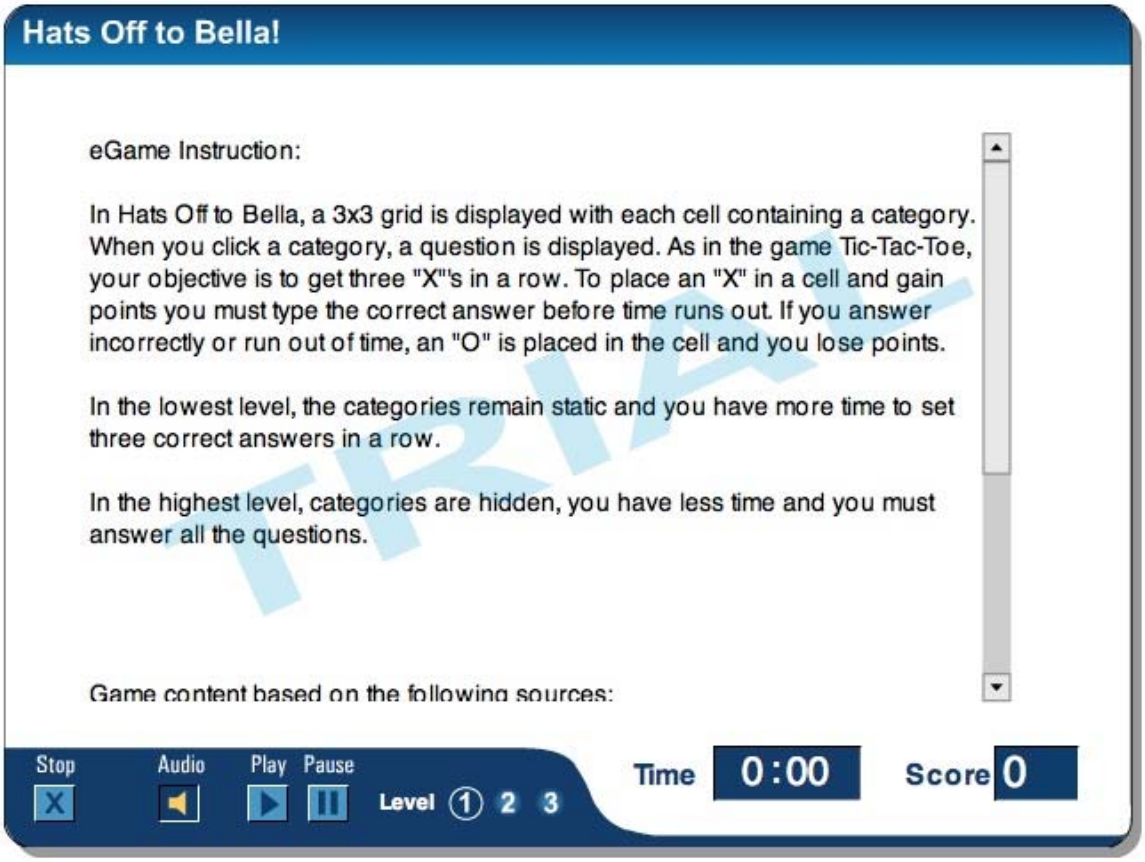
Pair It! Game Format

Instructional Revisions (Continued)



Order It! Game Format

Instructional Revisions (Continued)



Connect It! Game Format

APPENDIX J

SCREEN CAPTURES OF WEB PAGES WITH EMBEDDED GAMES

Photos of the students that participated have been replaced
with silhouettes to protect their identities

Group 1, Pair It! Game 1

Home | Timeline | Biographies | Activities | About | WebCt | Contact

Group 1, Pop It! Game 2

Group 2, Pop It! Game 1

Group 2, Connect It! Game 2

Group 3, Pop It! Game 1

Group 3, Pair It! Game 2

Group 4, Pair It! Game 1

Group 4, Order It! Game 2

Group 4, Order It! Game 3

Group 5, Pop It! Game 1

Game-based Motivation Strategy (GBMS) Delivery Plan

NOTE: The GBMS is designed to be delivered in a hybrid-learning environment (i.e., classroom and online) over one semester. However, the delivery plan is flexible and may be adjusted at any point to meet the instructor's teaching needs.

To ensure the strategy is understood, please review this document and the game content development form for each game type carefully before implementation. Additionally, make sure you become familiar with Carson Media's eGame Generator at:

http://www.clsllc.com/ep/egames/ index.html

Please consult your IT department for questions about using the eGames with Content or Learning Management Systems in your institution.

GAME-BASED MOTIVATION STRATEGY DELIVERY PLAN

Week	Activity	Instructor Tips
1	Play an overview game. It may be projected on a screen at the front of the room and used as an attention getter and as a pre-assessment of students' knowledge of Women In American History (WIAH) subject matter.	
2	Introduction of **1st instructional strategy - game playing.** Introduce the website with the preliminary games to be played. (Preliminary games are the games developed by students in a previous semester, or if this is the first semester, they are games the instructor has developed and uploaded to the site).	*The plan is designed for students to play the preliminary games for several weeks. Less time may be preferred, but the point is to make sure students have enough time to review game content, which should be discussed in class lectures. Students must also become familiar with how all game formats function to be prepared for the second Instructional strategy.*
3 through 7	Have students continue playing preliminary games online to assess their own progress in course, and to prepare for WIAH course quizzes and exams.	
8	1. Introduce **2nd Instructional Strategy - Game Content Development Activity**. Have copies of Game Content Development Forms available for each of the four game formats: 1) Pop It! 2) Connect It! 3) Pair It! and 4) Order It!. 2. Have students form small groups of four or less individuals.	

Week	Activity	Instructor Tips
8 (cont.)	3. Have groups choose the woman to be featured in their games based on a list of women from the instructor's curriculum (*Each group should choose a different woman*). 4. Give student's the following criteria: ▪ Research background of the woman selected by your group. Provide sources. ▪ Develop twenty questions with answers about the woman researched. ▪ Fill-in Game Content Development Form ▪ Include citations for game's content source (MLA or APA style) 5. Have students decide on one of the four game formats and pass out corresponding Game Content Development Forms with completed samples. 6. Go over the instructions for filling in Game Content Development Forms with the class and answer any questions students may have about the Forms or the assignment overall. 7. Tell students that group pictures will be taken for the purpose of recognizing their efforts as game content authors and uploaded with their games to be placed on the WIAH website.	• *Helen Keller* • *Sarah Grimke* • *E.C. Stanton* • *Dorothy Day* • *Anne Hutchinson* • *Harriet Tubman* • *Bella Abzug* • *Wilma Mankiller* *Allow students at least one week to complete the assignment.* *Members in each group should choose different game formats.* *One game format per group member with the exception of the Order It! Game. (Due to the limited number of items in the Order It! game, students are required to do two Order It! games if the Order it! format is their choice)*
9	Have groups engage in discussion and peer review of completed Game Content Development Forms; then submit the forms to instructor.	*While groups are engaged in peer review discussion, use this time for taking pictures of each group (one group at a time).*

Week	Activity	Instructor Tips
10	1. Edit Game Content Development Forms for accuracy of content and to ensure questions and answers are entered according to the directions on each form. 2. Enter content from each Game Content Development Form into eGame Generator on Carson Media's website located at http://www.clsllc.com/ep/egames/index.html 3. Publish games as trial games and upload to WIAH website so that students may verify if content is correct. 4. Generate a Print Copy from the eGame Generator for each game and attach to the corresponding Game Content Development Form	*The instructor, or person designated by the instructor should set up a free account on the Carson Media Website, then Login to the eGame Generator and follow directions on screen to begin entering content from the student's Game Content Development Forms.* *In the eGame generator, citations may be added for each game under the "eGame Instructions" which displays first on screen upon launching each game.* *The games may be published with information that allows them to be integrated with a Learning Management System to track student game play scores. To do this, make sure to indicate "yes" for LMS in the eGame Generator.*
11	1. Pass out the Content Review Sheet with attached instructions 2. Also return Game Content Development Forms to students with attached Print Copies, then explain to students how to review their Game Content Development forms and Print Copies using the Content Review Sheet instructions.	

Week	Activity	Instructor Tips
	2. Have students submit to instructor the completed Content Review Sheets, Game Content Development Forms, and Print Copies.	*Allow students at least one week to complete the assignment.*
12	1. Make revisions on trial games in eGame Generator based on changes indicated on students' completed Content Review Sheets. 2. After revisions, republish the games in non-trial mode and upload them with corresponding group photos to the WIAH website game pages.	

GAME CONTENT DEVELOPMENT FORM

History 28: Women in American History

Name of Woman:_____

Game Type: Connect It!
In this game the player chooses a category of knowledge displayed on the game board and then types a short answer to a question about that category of knowledge. With correct answers the user receives an "X" and gains points, with incorrect answers the user receives an "O" and loses points. Like the game Tic-Tac-Toe, the player's task is to correctly answer questions in any three boxes in a straight line.

Game Name:_____
Create a name for your game. Choose something that refers to the life of the woman that you are developing the question and answer items for.

Cite sources for your content: Refer to an APA or MLA Style Guide.
APA example: Baddeley, A. D. (1999). *Essentials of human memory*. Hove, England: Psychology Press.

MLA example: Nabokov, Vladimir. Lolita. New York: Putnam, 1955.
_____
_____
_____

Number of Items (questions) to include in this game: 20
Develop 10 questions with answers for two categories about the woman you are researching. For example, categories might be "Heritage" and "Historical Events."

Questions:
Design questions and "statements-to-complete" with the appropriate punctuation. For example, use capital letters at the beginning of sentences and periods at the end. Use
Question marks at the end of questions, and use commas to separate dependent and independent clauses. **Do not exceed 260 characters (including spaces) for each question.**

Answers:
There can only be one right answer. Keep answers factual and precise. Avoid descriptive words that are subjective or can be interpreted in more than one way. Brief concept phrases or one word answers are best. Use punctuation only where necessary. For example, capitalize proper nouns but do not use commas or periods. **Do not exceed 60 characters (including spaces) for each answer.**

Game Type: Connect It! Game Name_____ Items continued

1st Category Name:		
Item #	**Questions (260 Character Limit)**	**Answers (260 Character Limit)**

Game Type: Connect It! Game Name_____ Items continued

2nd Category Name:		
Item #	**Questions (260 Character Limit)**	**Answers (260 Character Limit)**
Content Developers		
1		
2		
3		
4		
5		
Date:		Instructor's Initials:

GAME CONTENT DEVELOPMENT FORM

History 28: Women in American History

Name of Woman:_____

Game Type: Pair It!
In this game the player identifies pairs of related items. The game board displays several tiles with information on each. The player's task is to pair up the tiles correctly.

Game Name:_____
Create a name for your game. Choose something that refers to the life of the woman that you are developing the question and answer items for.

Cite sources for your content: Refer to an APA or MLA Style Guide.

APA example: Baddeley, A. D. (1999). *Essentials of human memory*. Hove, England: Psychology Press.

MLA example: Nabokov, Vladimir. Lolita. New York: Putnam, 1955.

_____
_____
_____

Number of Items (questions) to include in this game: 20

Matching Pair Parts

Develop questions and answers as "matching pairs." Enter one part of the matching pair in the Part A column. Enter the other part in the Part B column.

Design matching pair items with accurate spelling and punctuation. Brief concept phrases or one word statements are best. Do not exceed 50 characters (including spaces) for each part of a matching pair.

Game Type: Pair It! Game Name_____ Items continued

Item #	**Part A (50 Character Limit)**	**Part B (50 Character Limit)**

Game Type: Pair It! Game Name_____ Items continued

Item #	Part A (50 Character Limit)	Part B (50 Character Limit)
Content Developers		
1		
2		
3		
4		
5		
Date:		Instructor's Initials:

GAME CONTENT DEVELOPMENT FORM

History 28: Women in American History

Name of Woman:_____

Game Type: Pop It!
In this game the player rapidly types short answers to questions that display five at a time in tiles on the game board.

Game Name:_____
Create a name for your game. Choose something that refers to the life of the woman that you are developing the question and answer items for.

Cite sources for your content: Refer to an APA or MLA Style Guide.

APA example: Baddeley, A. D. (1999). *Essentials of human memory*. Hove, England: Psychology Press.

MLA example: Nabokov, Vladimir. Lolita. New York: Putnam, 1955.

_____
_____
_____

Number of Items (questions) to include in this game: 20

Response to Stimulus
Develop questions and answers as "response to stimulus." The stimulus is what is displayed. The response is what the eGame expects the player to enter.

Stimulus:
Design stimulus items with the appropriate punctuation. For example, use capital letters at the beginning of sentences and periods at the end. Use question marks at the end of questions and use commas to separate dependent and independent clauses. **Do not exceed 60 characters (including spaces) for each answer.**

Response:
There can only be one right response. Keep responses factual and precise. Avoid descriptive words that are subjective or can be interpreted in more than one way. Brief concept phrases or one word responses are best. Use punctuation only where necessary. For example, capitalize proper nouns but do not use commas or periods. **Do not exceed 60 characters (including spaces) for each answer.**

Game Type: Pop It! Game Name_____ Items continued

Item #	**Stimulus (60 Character Limit)**	**Response (60 Character Limit)**

Game Type: Pop It! Game Name_____ Items continued

Item #	Stimulus (60 Character Limit)	Response (60 Character Limit)
Content Developers		
1		
2		
3		
4		
5		
Date:		Instructor's Initials:

GAME CONTENT DEVELOPMENT FORM

History 28: Women in American History

Name of Woman:_____

Game Type: Order It!
In this game the player arranges a list of items. The game board displays several items (for example, stages in a process, steps in a procedure, or elements of a hierarchy) in a random order. The player's task is to rearrange these steps (or items) in the correct order.

Game Name:_____
Create a name for your game. Choose something that refers to the life of the woman that you are developing the item statements for.

Cite sources for your content: Refer to an APA or MLA Style Guide.

APA example: Baddeley, A. D. (1999). *Essentials of human memory*. Hove, England: Psychology Press.

MLA example: Nabokov, Vladimir. Lolita. New York: Putnam, 1955.

_____
_____
_____

Number of Items (statements) to include in this game: 7

Order of Statements

Enter items below in correct order. Be aware of the relationships between chunks of information, for example, an event in history that happens before another event. Design item statements with the appropriate punctuation. Brief concept phrases or statements are best. **Do not exceed 45 characters (including spaces) for each part of a matching pair.**

Game Type: Order It! Game Name_____ Items continued

Item #	Items (45 Character Limit)

Content Developers	
1	
2	
3	
4	
5	
Date:	Instructor's Initials:

GAME CONTENT REVIEW SHEET

Instructions

PART I – Your Game Review

1. Please review the Print copy of the game content for the game you developed. It is attached to your edited Content Development Form.

    a. Check for continuity and logical flow between your questions and answers.

    b. Check for spelling, grammar, and punctuation.

    c. On the Print copy, draw a line through any incorrect item. Write the correction underneath the item.

2. Go to the web page containing your game on the WIAH website

    a. Click on the title of your game.

    b. Check the game's title on the game board interface. Is it correct? If not, Please print the incorrect title, that appears on the game board, in the left column and the correct title in the right column in Part I on the following page.

    c. Check the sources listed under the game instructions at the beginning of the game. Are they incorrect or incomplete? If so, please print the incorrect source, which appears on the game board, in the left column and the correct source in the right column in Part I on the following page.

    d. Play your game.

PART II – Your Group Member Game Review

1. Go to the web pages containing games of your group members on the WIAH website

    a. Click on the game title of one other member of your group and play her/his game.

    b. Briefly answer the questions and provide comments about this game in Part II on the following page.

    c. Return Game Content Review Sheet, Game Questions and Answers, and Game Content Development Sheet to your instructor.

Part 1 - Your Game Review	
Your Name:	Game Title:
Incorrect	**Correct**
Title:	Title:
Source 1:	Source 1:
Source 2:	Source 2:
Source 3:	Source 3:
Source 4:	Source 4:

Part II – Your Group Member Game Review		
Group Member's Name:	Game Title:	
The game(s) I played were based on information familiar to me.	Yes	No
Even if I did not know all the answers, the questions presented in the game made sense to me except for the following questions:	Yes	No
1.		
2.		
3.		
Other comments about this game:		