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Reviewed work(s):

Source: *Educational Technology Research and Development*, Vol. 54, No. 3 (Jun., 2006), pp. 245-263

Published by: [Springer](#)

Stable URL: <http://www.jstor.org/stable/30221219>

Accessed: 28/10/2012 19:28

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Game Design Narrative for Learning: Appropriating Adventure Game Design Narrative Devices and Techniques for the Design of Interactive Learning Environments

□ Michele D. Dickey

The purpose of this conceptual analysis is to investigate how contemporary video and computer games might inform instructional design by looking at how narrative devices and techniques support problem solving within complex, multimodal environments. Specifically, this analysis presents a brief overview of game genres and the role of narrative in popular adventure game design, along with an analysis of how narrative supports problem solving in adventure games. Additionally, an analysis of the underlying structure used in game design for developing narratives is presented along with design heuristics for constructing narratives for educational purposes.

Keywords: computer games, video games, narrative, learning environments

□ It is through narrative constructs that we frame and recount daily experiences in problem solving. Although narrative structure is often imposed on daily problem-solving encounters, within the field of instructional design, relatively little research has been conducted about the design of compelling narratives for the support of problem solving and other educational activities. One avenue worth exploring is contemporary game design and the use of narrative in *adventure* games to provide scaffolding and support problem solving. Game designers are well versed in devices and techniques for constructing compelling and engaging narratives that allow for immersion and agency, demand the participation of users, and yet also provide scaffolding for problem solving. Looking at how narrative supports problem solving within complex, multimodal spatial environments such as popular game design will

likely inform instructional designers of how narrative can be meaningfully integrated into interactive learning environments and game-based learning environments.

The purpose of this conceptual analysis is to investigate how contemporary video and computer games might inform instructional design by looking at how narrative devices and techniques support problem solving within complex, multimodal environments. Specifically, this analysis presents (a) a brief overview of game genres and the role of narrative in popular adventure game design, (b) an analysis of how narrative supports problem solving in adventure games, (c) an analysis of the underlying structure used in game design for developing narratives, and (d) a framework of design heuristics for constructing narratives for educational purposes. The goals of this analysis are to analyze how various narrative devices and techniques scaffold problem solving in popular game design and to suggest guidance for creating narratives for the instructional design of interactive learning environments and game-based learning environments.

LITERATURE REVIEW

The design of popular computer and video games has been a source of study for educational researchers and instructional designers investigating how various aspects of game design might be appropriated, borrowed, and repurposed for the design of educational materials (Bowman, 1982; Dickey, 2003, in press; Malone, 1981; Prensky, 2001; Provenzo, 1991; Rieber, 1996; Squire, 2003). Several explanations have been proposed as to why games are popular and which aspects might best be appropriated for instructional design. Bowman and Provenzo have each investigated the motivational supports in popular game design of their eras. Bowman applied Csikszentmihalyi and Lawson's (1980) *flow state interaction* to help explain motivation of extrinsic supports found in the game, Pac-Man. Malone investigated a series of games and identified the elements of challenge, fantasy, and curiosity as being key aspects of design that fostered engagement. Provenzo applied Malone's elements of challenge, fantasy, and curiosity to deconstruct and explain the intrinsic motivational support of Super Mario Bros. 2. Bowman, Malone, and Provenzo each contemplated how game design elements might be integrated into education. Whereas Bowman's study focused primarily upon the feedback cycle and motivation, Provenzo's addressed aspects of intrinsic motivation. Although these studies are informative, game design has evolved since the era of Pac-Man and Super Mario Bros. 2, yet the element of *fantasy* identified in Provenzo, Malone, and Rieber's work may be of significant value when

investigating the complex design of contemporary popular games. Malone characterized fantasy as being either extrinsic or intrinsic to game play. According to Malone, extrinsic fantasy is external to game play with no impact on game play. In contrast, intrinsic fantasy is internal to the game-play experience; there is a reciprocal relationship between game play and fantasy. Malone argued that intrinsic fantasy is more interesting and potentially more instructional than extrinsic fantasy because intrinsic fantasy may be designed to indicate how a skill might be used in the real-world setting, and may provide metaphors or analogies to aid in understanding (1981). Rieber similarly argued that fantasy allows for imaginative and creative thinking. Rieber characterized fantasy in games as either exogenous or endogenous to the context of a game. He argued that exogenous fantasy is the type of sugarcoating, or frivolous and extraneous feature, often found in educational games in which fantasy (narrative) has no impact on game play (p. 49). To illustrate the difference, Rieber used the game hangman as an example. Any scenario imposed over the game does not impact game play in any way. Endogenous fantasy, on the other hand, is integral to the content of the game; there is no separation between content (fantasy) and game play. According to Rieber, endogenous fantasy may be more suited to educational games because it has the potential to motivate learners who might be interested in the fantasy.

Along a similar line of inquiry, Gee's (2003) discussion of literacy and popular games also emphasized the value of fantasy and role playing in fostering multimodal literacy. According to Gee, popular games support problem solving by allowing players to become embodied in the game-play experience. As players move through fantasy or imagined worlds, they encounter situations and obstacles that require them to actively and critically reflect and solve problems. The multimodal environments of games provide embodied experiences in which players take on new roles and identities while managing complex multiple sign systems (semiotic domains) (Gee).

Within the field of game design, the element of fantasy such as that noted by Malone (1981), Provenzo (1991), Rieber (1996), and Gee (2003) is a type of fictional narrative. Fantasy narratives can be found in nearly all game genres. Realism-based narratives have also been integrated into game design. Games such as *Men of Valor: Vietnam*, *Medal of Honor*, and *America's Army* are designed to give a realistic story line based on real-world events and behavior. It is important to note that fantasy and realism can be and often are intertwined. Aarseth (1997) argued that realism-based narratives are a type of fantasy. Similarly it can be argued that fantasy-based narratives require elements of realism to establish plausibility within the narrative story line (Rollings & Adams, 2003). The line between the two is often blurred and the relationship between fantasy and realism is most adequately characterized as a continuum.

The benefit of integrating narrative into a learning environment is that it provides opportunities for reflection, evaluation, illustration, exemplification, and inquiry (Conle, 2003; Eisner, 1998). Narrative has been found to aid in comprehension (Laurillard, 1998) as well as serving as a tool for navigation in multimedia environments (McLellan, 1993). Although narrative has been integrated in the use of problem-based and project-based learning (Dodge, 1995; Egan, 1988; Laurillard, 1998; Weller, 2000), little has been written about how to create compelling narratives for various types of learning activities and environments.

Of the limited research, Schank, Fano, Bell and Jona's (1993) proposal of goal-based scenarios (GBS) integrated narrative to support learning. The purpose of GBS is to foster skill development and content knowledge within a simulated, situated context (Schank, Berman & Macpherson, 1999). Components that comprise GBS include the mission, a cover story, roles, and scenario operations (Schank et al., 1993). The underlying design consists of a somewhat realistic mission in which learners are presented with a goal that requires the application of skills and content knowledge to complete. Although elements of narrative are incorporated into the mission, cover story, and roles, the design of GBS relies primarily on realistic missions, and the discussion of creating a compelling cover story and roles is limited (Schank et al., 1993).

THEORETICAL FRAMEWORK

Winn (2002) proposed that the history of educational technology can be characterized in terms of four ages: (a) the age of instruction (cognitive-base design and research), (b) the age of message design (design and research of media and delivery), (c) the age of simulations (focus on simulations and interaction), and (d) the most current age, the age of learning environments. According to Winn, each age both builds upon and responds to that of its predecessor. Concurrent with the emergence of learning environments is the epistemological shift in paradigms of learning from an objectivist perspective to a constructivist perspective of learning. Certainly the rise of a constructivist epistemology of learning has precipitated the emergence of learning environments. Central to a constructivist theoretical perspective is the belief that knowledge is constructed, not transmitted, and that learners play an active role in the learning process (Duffy & Cunningham, 1996; Johnson & Johnson, 1996; Jonassen, 1999). Value is placed on discourse opportunities because the social nature of learning is not only acknowledged, but fostered (Jonassen; Winn). To foster the construction of knowledge, learners should have opportunities for exploration, interaction, and manipulation within the learning environment. As a

result of this shift, instructional designers and educational researchers are looking at learning in a holistic context (Hannafin, Hall, Land, & Hill, 1994; Hannafin & Land, 1997; Hannafin, Land, & Oliver, 1999; Jonassen; Land & Hannafin, 1996; Land & Hannafin, 1997). The movement toward learning environments offers an alternative to the factory model of education in which each student does the same thing at the same time. With the advent of widespread technology integration, this epistemological shift requires the development of new methods and models for teaching. The nature of learning environments incorporates multiple methods for instruction, multiple modals of materials, and opportunities for learners to play an active role in decision making and problem solving. Because learners have more control in the learning process, the learning environment must provide scaffolding to foster learners (Hannafin et al., 1994; Hannafin & Land, 1996, 1997; Hannafin et al., 1999; Jonassen; Land & Hannafin, 1996, 1997). In turn, new models and methods must be sought to support learner scaffolding for complex, multimodal learning environments. Possible models and methods may be found in existing media such as computer and video games.

GAME GENRE AND THE ROLE OF NARRATIVE IN GAME DESIGN

There is a wide variety of gaming genres, and each genre integrates narrative story line in varying degrees and manners (Sikora, 2002). Some of the more common game genres include: first-person shooter, role-playing, action, adventure, sports, racing, and strategy. It is difficult to characterize how narrative is handled in various gaming genres because game design is continually evolving and genres are often combined. Additionally, game genres are not clearly defined by the game design community. For every sweeping statement of how narrative is used within a genre, counterexamples can nearly always be found. Given that fact, *typically* narrative plays a more prominent role in role-playing games (RPGs), action games, and adventure games than in first-person shooter games, sports games, and racing games. RPGs often rely heavily on the integration of strong narrative story lines to advance the game play. In RPG games, the player is often cast as the central character who is confronted with a quest or mission. Throughout the game-play mission, this character undergoes many changes as a result of the trials and tribulations he or she confronts (e.g., *Neverwinter Nights*, *Baldur's Gate*, and *Final Fantasy*) (Sikora). Action games also integrate the use of narrative (e.g., *Diablo*, *Doom*, and *Dark Cloud*), but often to a lesser degree. Narrative is typically used to establish the setting and initial motivation, but often it is not the main focus of game play. Among the various gaming genres, the adventure genre is one in which narra-

tive typically plays the most prominent and defining role in the design. In fact, for some of the most popular games of this genre, the story line *is* the game (e.g., *Myst*, *Riven*, *Syberia*, and *The Longest Journey*). The player is often placed in a first-person perspective of having to solve problems in order to advance the plot. Throughout various scenes in the game, players may collect objects, learn processes, access information from a variety of sources, and interact with nonplayer characters (NPCs). They then use these multiple modes of information to solve problems they encounter. The types of problems often require players to combine various objects and enact processes to form solutions. Adventure games are among the oldest of the computer gaming genres with roots that can be traced to text-based interactive fiction or adventure games such as *The Colossal Cave Adventure* (Hafner & Lyon, 1996; Levy, 1984).

Within popular game design, there are several game devices used both to convey narrative and to help players in constructing and uncovering the narrative story line. Backstory and cut scenes are two common methods for integrating and conveying narrative story line to players. The purpose of backstory is to provide the dramatic context for the game (Crawford, 2003). The backstory may be as simple as a couple of paragraphs on the outside packaging which detail the central conflict and main character, or it may be as complex as a full-action video presented at the beginning of the game, supported with a host of manuals, player guides, maps, and other materials. Cut scenes are short sections of narrative interspersed and revealed during the course of game play. They may take many different forms, such as a radio broadcast, a journal entry, a story delivered by a NPC, or even a full motion video. The purpose of a cut scene is to further the story line and reinforce the mood and tone of the game. Cut scenes are also used as *information dumps* that supply the player with necessary information. A cut scene may also present flashbacks, parallel action, foreshadowing, and cliffhangers, and include red herrings meant to purposely delude the player (Hancock, 2002; Onder, 2002). Cut scenes are typically presented when a player has completed some action that advances the game play. Cut scenes also may be used to introduce new elements, twists, or perspectives to the story.

NARRATIVE AND PROBLEM SOLVING

The adventure genre can be characterized as a problem-solving environment. Players are placed in scenarios in which they must synthesize diverse information and analyze strategies. Within the adventure game genre, narrative provides two main functions: both motivation and a cognitive framework for

problem solving. Although it is difficult to select a game that ideally characterizes a genre, for the purposes of exemplification, the popular adventure games *Syberia* and *Syberia II* will be used for the following discussion about narrative as a motivator and narrative as a cognitive framework for problem solving within a complex multimodal environment such as the popular adventure game genre.

Narrative and Motivation

In adventure games, there are two primary literary techniques integrated into narrative, which provide motivation: plot hooks and emotional proximity. The first, plot hooks are present in both backstory and cut scenes. A plot hook is a strategy common to many types of literary genres (serials, romance, and mystery fiction). *Plot hooks* are unanswered questions that keep the reader guessing; they are uncertainties that focus the attention of players by planting questions that the player feels compelled to answer. The purpose of plot hooks is to arouse curiosity, create intrigue, and frame puzzles, which all lead the player to ask, "What is going to happen next?" Good plot hooks put players in the middle of an action without providing much exposition. The player is either faced with some choice or must answer a call to action. Typically, players find clues and information in various formats embedded in the environment which will help them overcome an obstacle or solve a problem. Either near or upon completion of one problem, obstacle, or task, another question (plot hook) in the form of a cut scene is delivered, which both advances the story line and presents another plot hook designed to further motivate the player.

The second literary technique that serves to motivate players is the establishment of emotional proximity between the player and the role he or she is playing. *Emotional proximity* is characterized as empathy and identification the player feels toward his or her character in a game. Similarities between player and character can help establish emotional proximity, but what is more important is creating characters with characteristics with which players can identify. For example, in the beginning of the game *Syberia*, the protagonist, Kate, is under pressure from her job, family, and fiancé. She expresses feelings of stress and frustration as she attempts to appease each. These are characteristics and circumstances to which male and female players can relate. Emotional proximity can be established by creating multidimensional characters with both strengths and flaws (Freeman, 2003) and by having characters that change or grow through the duration of the game (Rollings & Adams, 2003).

Interactive Narrative as a Cognitive Framework

The role of narrative in adventure games is to provide initial and ongoing motivation for the game. Although motivation is an important aspect of instructional design, where the role of narrative in adventure games may be most informative is in how it serves as a cognitive framework for problem solving. Narrative is ubiquitous in human reasoning and allows humans to assign meaning to their experiences (Bruner, 1990; Scholes & Kellogg, 1966). Humans use narrative not only to frame thought, but to guide actions (Polkinghorne, 1988). According to Robinson and Hawpe (1986), narrative is a type of causal thinking in which the narrative (cognitive) schema identifies categories (protagonist, situation, conflict, outcome, etc.) and relevant types of relationships (temporal, motivational, and procedural). Thinking within a narrative framework requires integrating experiences (which do not necessarily occur in narrative form) into a plausible story line (Robinson & Hawpe).

The narrative story line in adventure games provides an environment in which players can identify and construct causal patterns that integrate what is known (backstory, environment, rules, etc.) with that which is conjectural yet plausible within the context of the story. The context and setting in the form of backstory establish boundaries of what is plausible. It is during the backstory that the physical, temporal, environmental, emotional, and ethical dimensions of the game are established (Rollings & Adams, 2003). The physical dimensions are the physical boundaries of the game-play environment. The temporal dimensions are aspects of time and timing. The environmental dimensions define the characteristics of the game, such as fantasy or realism, as well as the historical and/or geographical setting (Rollings & Adams). During the backstory, characters and motives are introduced, and these help characterize the emotional and ethical dimensions of the game. This sets the stage, so to speak, for what is plausible within the context of the game. For example, within the game *Syberia*, the initial action takes place in the semi-realistic Alpine village of Valadilene. The main character, Kate, is a New York-based lawyer sent to Valadilene to conclude the acquisition of a famous mechanical toy factory. Elements such as faxes and cell phones reinforce the sense of realism within the game, yet the human-like mechanical automatons provide an element of fantasy. Given the setting and main character, it is not plausible for players to look for magic spells for solutions to obstacles Kate encounters. Solutions in more realistic forms, such as combining mechanical objects, reading diaries, and dialoguing with NPCs are more plausible, given the setting, character, and nature of the problems encountered. In this example, the narrative backstory establishes the boundaries. Players make conjectures about overcoming obstacles and solving problems based on what is plausible within those

boundaries. The environment, in turn, provides clues in the form of inventory (e.g., diaries, faxes, documents, and mechanical objects and pieces), conversations with other characters (mechanical and human), and sounds. Players combine information and form conjectures about what combinations and processes might assist Kate in accomplishing a task or overcoming an obstacle. Players are put in a position of having to make conjectures about causal relationships between various forms for inventory and information. Discovery and trial and error play roles in this process, but the narrative provides a cognitive framework for problem solving by establishing what is plausible for constructing causal relationships.

Plausibility in game design narrative is established through the interplay between the characters, events, and environment. Typically, characters play specific roles in relation to the narrative line in adventure games. For example, in *Syberia*, the character of Oscar serves as a guide during part of the narrative. Although initially their relationship is a bit antagonistic, Oscar provides a type of metacognitive support by asking Kate key questions, offering opinions, and allowing Kate to reflect and engage in dialogue for problem solving. Plausibility is also established through the interplay between the character and the environment. In the example of *Syberia*, some of the obstacles Kate must overcome require her to complete various procedure and processes. Resources found in the environment, such as mechanical objects or plans and maps, allow her to complete those processes.

DISCUSSION: NARRATIVE AND PROBLEM-SOLVING

The assertion of this analysis is that narrative in adventure games supports problem solving in complex, multimodal environments both by providing motivation and by serving as a cognitive framework. Although there is research that addresses the role of motivation in game design (Bowman, 1982; Provenzo, 1991; Rieber, 1996), it does not fully explain how narrative serves to motivate in complex environments such as *adventure games*. Bowman's application of flow state interaction is applicable to action games and first-person shooter games in which performance and feedback fuel motivation. Although Provenzo's work addressed the notion of fantasy (narrative), narrative was limited because of the nature of *Super Mario Bros. 2*. Rieber's work, to some degree, addressed how narrative can serve to motivate players when it is integral to game play. According to Rieber, when learners (players) are presented with a problem, they "will seek resolution if a solution seems possible and within reach" (p. 49).

There is little research that recommends how emotional proximity might serve as a motivator; however, Malone's (1981) work suggested that some of the appeal of games may be derived from the emotional needs that a game may fulfill. Certainly explanations exist outside of the research of instructional design and educational psychology. Literary theory may provide some insight. Barthes (1975) argued that narratives perform significant functions on both a personal and cultural level. According to Barthes, narratives allow individuals to construct a sense of self and goals. On a cultural level, narratives serve to transmit values and cultural beliefs. The stories enacted in popular games may be a source of reassurance of cultural codes and values. Narrative may also be a source of pleasure. According to Aristotle (Halliwell, 1987), a drama that elicits emotions of pity and fear may have a type of cathartic (katharsis) effect on the audience. Drama may arouse strong emotions, which are typically kept in control in day-to-day interactions. As the dramatic action unfolds in a drama, these strong emotions are released through emotional proximity to the protagonist, resulting in a cathartic experience.

Although Malone's research into game design predates contemporary adventure games, Malone's (1981) arguments of the value of intrinsic fantasy provide support of how narrative (fantasy) can serve as a cognitive framework for problem solving. It is interesting to note that Malone makes casual mention of how intrinsic fantasy supports "the Adventure game," referring to the precursor of the adventure game, the Colossal Cave Adventure. Malone argued that intrinsic fantasy provides examples and illustrations of how a skill acquired or used within a game might be used in the real world. Players synthesize information from a variety of sources and perform actions based on their informed conjectures. Narrative game scenarios provide environments in which players can gain and practice skills which may then be applied to a real-world setting.

NARRATIVE STRUCTURE IN ADVENTURE GAMES

A common structure found in most adventure games (and indeed many computer games of all genres) is the quest. Players often take on a role (pre-constructed or, with the advent of massive multiplayer online games, self designed) and embark on a long and arduous journey that will require the player to overcome various conflicts encountered along the way. The quest is a common structure that occurs throughout Western literature, from the works of Homer, Chaucer, Cervantes, and Joyce, to, more recently, such popular films as *Star Wars*, *Sleepless in Seattle*, *The Matrix*, and *Finding Nemo*.

Although the quest often appears as or requires some type of journey, it may also be manifested as an emotional or metaphorical journey.

In the literature of game design, one of the more frequently cited sources of guidance and inspiration for the design of narrative is Vogler's (1998) work on mythic structures and writing (Crawford, 2003; Dunniway, 2000; Rollings & Adams, 2003). Vogler's work relied on that of foremost scholar of mythology, Joseph Campbell's *The Hero with a Thousand Faces* (1973), in which Campbell outlined the reoccurring myths or monomyths that, as Campbell argued, occur and transcend time and culture. Vogler identified and outlined the hero's journey as it relates to contemporary storytelling. Vogler's contemporary quest or hero's journey comprised the following 12 stages:

1. Ordinary World
2. Call to Adventure
3. Refusal of the Call
4. Meeting with the Mentor
5. Crossing the First Threshold
6. Tests, Allies, Enemies
7. Approach to the Inmost Cave
8. Ordeal
9. Reward (Seizing the Sword)
10. The Road Back
11. Resurrection
12. Return with the Elixir

According to Vogler (1998), in the first stage, the hero is situated in the ordinary world (or whatever may be construed as ordinary). Then the hero is presented with a problem, challenge or event that necessitates leaving the comfort and familiarity of the ordinary world (a tornado hits Kansas, a young girl falls into a rabbit hole, a computer hacker encounters proof that he may be living in a simulation and not reality, or in the case of the game *Syberia*, the signature of the owner of a factory is sought.) At this point, the hero may refuse, balk, or have reservations about undertaking the adventure. Next, the hero meets a mentor or someone who may offer advice or guidance (Glenda the Good Witch, Morpheus, Oscar the automaton). Once the hero commits to the adventure, he or she begins the problem-solving process. During this process or jour-

ney, the hero encounters various problems and challenges that must be overcome in order to progress. The hero also makes allies and enemies. All of the problems, tests, and challenges lead the protagonist to the inmost cave. The *inmost cave* is the site for the central challenge for the hero; it is the situation all other challenges have been leading toward. Often, during the peak challenge, there is a moment when all seems lost (Neo dies, the deadline is not met and the bet is lost, Dorothy is trapped by the Wicked Witch), yet inevitably the hero overcomes the challenge and survives (Trinity revives Neo, there is a date change in different time zones, Dorothy throws water on the Scarecrow and inadvertently kills the Wicked Witch). Now that the hero has survived, the next stage is the journey home, yet the journey back is often fraught with problems and challenges and, potentially, leads to one last conflict or challenge before the hero returns to the ordinary world.

Vogler (1998) also offered guidance on the development of roles. The following seven character archetypes typically appear within the hero's journey: (a) hero, (b) mentor, (c) threshold guardian, (d) herald, (e) shapeshifter, (f) shadow, and (g) trickster. These archetypes are based on Jung's archetypal patterns which, Jung argued, are part of our collective unconscious (1953). Although Vogler advocated Jung's notion of character archetypes, Vogler stressed that archetypes should not be considered as fixed roles, but rather as a "function performed temporarily by characters to achieve certain effects in a story" (p. 30). Vogler advised writers to consider the psychological function of the archetype and the dramatic function in the progression of the story line.

DISCUSSION: NARRATIVE STRUCTURE IN ADVENTURE GAMES

Vogler's (1998) guidelines provided the framework for the way that many popular adventure and actions games are structured. It is a format that is both familiar and flexible, a structure that lends itself to both fantasy and reality-based narrative. In the adventure game, narrative serves as a motivator because players are placed in the center of action. Although the complexity of a well-drawn character affords emotional proximity, the familiarity of the narrative structure may also support emotional proximity by, as Barthes (1975) asserted, serving as source of reassurance of cultural codes and values while at the same time providing scaffolding for problem solving. Gee (2003) argued that games support multimodal literacy because, as players encounter problems and obstacles, they must critically analyze and take action to solve problems. Vogler's outline of the hero's journey provides a narrative structure for framing problems and challenges. According to Robinson and Hawpe (1986), narrative is a type of causal thinking in which the narrative cognitive schema

identifies categories (protagonist, antagonist, conflict) and relevant relationships. It could be argued that Vogler's (or more precisely, Campbell's 1973) notion of the hero's journey may be part of human cognition. Integrating this form into a learning environment may allow learners to build upon and solve problems in a familiar context. Although Vogler's form is most often used for the design of popular games, it could also be adapted for the design of interactive and game-based learning environments. To do this, instructional designers would have to decide to what degree game design narrative might be integrated and determine where and how the learner would be situated within the narrative. Also, points of potential conflict would have to be identified and invented. After problems or challenges were met, learners might be given cut scenes that would continue the narrative and present another challenge.

There are often elements of narrative present in problem-based, project-based, and case-study learning activities, however, narrative is typically used to frame the activity and rarely carried beyond the initial call to action (Dodge, 1995; Laurillard, 1998; McLellan, 1993; Schank et al., 1993; Weller, 2000). Roles are assigned at the beginning of the activity, but often not much discussed beyond the introductory phase. Additionally, rarely has there been discussion into the function of roles beyond that of task assignments. Gee (2003) argued that games provide support for problem solving by allowing players to assume new roles and identities and become embodied in the game-play experience. Character archetypes, such as those often found in game design, potentially may support learners' becoming embodied in a computer-mediated learning environment as well as in a traditional classroom environment. Vogler's form may provide a model for the design of compelling characters to support problem solving in interactive learning environments and game-based learning environments.

Game design narrative provides insight into how and why carrying the narrative through an activity might enhance learning. Online RPGs have a long history of maintaining narrative lines throughout open-ended game play. Although Vogler's structure has a beginning, middle, and end, it is a structure that also recurs in games without end. For example, such popular online massive multiple online games (MMOGs) as *EverQuest*, *Starship Galaxy*, and *Lineage II* have successfully integrated elements of game design narrative into a type of game play in which there is no final goal or attainable victory condition (Jakobsson & Taylor, 2003). Although not all learning activities may be suited to a hero's journey, it can provide a model of how narrative may be interwoven to provide motivation and cognitive scaffolding.

INTEGRATING ADVENTURE GAME NARRATIVE INTO THE LEARNING ENVIRONMENT

The following section includes a framework of design heuristics for guiding the creation of game design narrative in instructional design. This framework is not intended to serve as a formula for design, but rather is intended to identify components of game design narrative and suggest how they might be integrated into an interactive and/or a game-based learning environment. Individual learning goals or outcomes will likely impact how these components might be adopted and implemented in the learning environment.

Design Heuristics for Integrating Game Design Narrative in Instruction

Present the initial challenge

At the core of the quest is a major challenge; it is the apex or climax of the narrative. In a learning environment, the central challenge may be a problem or project that will serve as the catalyst of the story line and the goal for learning. Identifying this component is vital to developing the story line. It will likely be mentioned in the backstory and call to action.

Identify potential obstacles and develop puzzles, minor challenges, and resources

Leading up to the main challenge are smaller obstacles and challenges. In a learning environment these could be procedures, skills, and content knowledge that will help learners complete the central challenge. Embedded in the environment (and throughout the journey) may be models, exemplars, resources, and tools that learners may encounter (or have to search for) that may facilitate problem solving and help learners complete challenges or overcome obstacles.

Identify and establish roles

Throughout the journey, the hero encounters many characters and situations which play certain roles in the journey. These roles serve a particular function. In a learning environment the following roles might correspond to the following functions.

- The Hero will be taken on by the learner. The hero role is an agent of action who encounters the journey and other roles from a first-person perspective.
- The Mentor might provide guidance in the form of metacognitive scaffolding to help foster learner reflection, analysis, planning, and evaluation of strategies.

- The Threshold Guardian might be a character or even a situation that tests the learner's content knowledge. The Threshold Guardian might also be a situation or obstacle that the hero-learner has to circumvent using newly gained procedural skills.
- The Herald signals change and new information. This role could be reenvisioned as the introduction of new knowledge or a twist in the plot.
- The Shapeshifter represents doubt. In the learning environment doubt can be overcome with tasks that require the application of argumentation and persuasion skills.
- In the classic quest, the Shadow is often the confrontation with the main antagonist; however, in a learning environment, the Shadow may be the main challenge or conflict.
- The Trickster could also be reenvisioned as both comic relief and self-reflection.

Establish the physical, temporal, environmental and emotional, and ethical dimensions of the environment

A large part of the game-play experience is the setting. According to game designers Rollings and Adams (2003), a game setting can be defined by physical, temporal, environmental, emotional, and ethical dimensions.

- The physical dimension defines the physical space in which the player's character or game pieces move around (Adams, 2003; Rollings & Adams, 2003). For a learning environment, this might be the classroom, or the classroom and the Web. It might include other sites and locales as well.
- The temporal dimension (Rollings & Adams, 2003) defines the role of time in the game. It not only describes temporal aspects, such as how much time a player has to complete an action, but also defines whether the game will include nightfall, seasons, or time passage, and delineates the impact that time passage will have on game play. In a learning environment, this will likely be established in the backstory. Project-based learning activities might include a time line for which learners must complete projects.
- The environmental dimension (Rollings & Adams, 2003) not only defines the game setting appearance, but also characterizes the game setting as fantasy or realism, the

historical context and the geographical location, and the overall mood and tone. In the learning environment, it is very important that the environmental dimensions be clearly defined and maintained so that learners have a clear sense of the boundaries. The impact of the narrative story line is dependent on conveying the environmental dimension because it will support plausibility in the narrative line.

- The emotional dimension describes the emotions of the characters, whereas the ethical dimension defines the moral aspects of the game. In a learning environment, both are necessary for defining well-developed characters and supporting the narrative story line by reinforcing plausibility.

Create a backstory

In a learning environment, the backstory will likely outline the environment, ethical, physical, emotional, and temporal dimensions of the narrative as well as including a profile of the protagonist(s). The central challenge or initial call to action may be introduced at this time.

Develop cut scenes to support the development of the narrative story line

Cut scenes provide the ongoing narrative. They may be used to deliver key information or plot hooks. In an educational context they could provide feedback about whether learners have successfully accomplished a task or aspect of instruction, and set up the next stage of the narrative by presenting another problem, conflict, or challenge.

It should be noted that there are similarities in the structure of game design narrative and goal-based scenarios (Schank et al., 1993; Schank et al., 1999). Both employ the use of challenges and roles. However, this investigation of game narrative provides further elaboration and strategies for developing narrative story lines and roles, along with methods for framing and continuing the story line in ways that may hook or motivate learners. This is not meant to suggest that game design narrative replace any components of goal-based scenarios, but rather to present strategies for creating compelling narratives for interactive and game-based learning environments.

CONCLUSION

The purpose of this conceptual analysis was to analyze how narrative in adventure games supports problem solving, and how methods, devices, and techniques that support narrative in adventure games might inform instruc-

tional designers and educators. It is important to acknowledge that games are designed primarily for entertainment. The types of narrative structures that serve to entertain likely will not meet all educational goals. It is also necessary to acknowledge that the basis of the hero's journey has traditionally been a tale of war and conquest. Although the notion of the quest appears in many cultures (Campbell, 1973), issues of race, gender, and culture should be taken into consideration when designing any instructional materials. Further research should be conducted about these issues. Additionally, it is not the purpose of this analysis to argue that the classic quest structure is the only narrative structure that may be integrated into interactive or game-based learning environments. It is the intent of the analysis to suggest that elements and components of adventure game design narrative may be of use and may provide guidance in the design of such activities as problem-based, project-based, and case-based learning within interactive and game-based learning environments. Compelling activities could be devised using Vogler's (1998) form for structuring both a learning arc and the various roles. There is great unexplored potential in investigating how to create compelling narratives to support different types of learning. Game design narrative is one potential model that may be of use to instructional designers and educators looking at how to develop engaging interactive learning environments. □

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