Stories, Games, & Learning Through Play: An Analysis of Narrative Affordances in Game-Based Instruction

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Abstract: Stories are the mechanism through which humans construct reality and make sense of the world around them. Yet, research on the positive effects of narrative in game-based and other learning environments is quite variable, and the relevance of narrative to the learning sciences is not well understood. Identifying precisely how narrative intertwines with human experience of the lived-in world requires the application of a situated cognition framework to understand recipient-content-context interactions as dynamic and co-determined. To begin unpacking this issue, a narrative-structured, game-based learning program, *Project TECHNOLOGIA*, was used to target in-context, on-the-fly dialogic interactions between narrative "producers" (i.e., instructors) and "recipients" (i.e., participating students). Results indicate that there may be value in pursuing narrative as an instructional game mechanic for complex social, cultural, and intellectual issues as well as the induction of real-world goal adoption. Recommendations for further research are provided.

Introduction

For millennia, stories have been used to frame human existence, learning, and culture. Yet, research aimed at reviewing and analyzing the positive influence of narrative in game-based and other learning environments is quite variable, and despite thousands of years of oral storytelling tradition, the relevance of narrative to theories of learning is not well understood or researched.

In response, this study was developed to reconcile what is assumed with what is known about the psychological underpinning of narrative. By highlighting the results of a narrative-structured, game-based learning program, *Project TECHNOLOGIA*, it addressed two specific questions regarding narrative as a tool and game mechanic for instruction:

1. How can narrative be optimally characterized with regard to impact on game-based learning?
2. What are the specific affordances of storytelling and narrative structure for supporting game-based learning?

If humans share knowledge, encourage investigation, and promote creative acts through narrative, identifying the connection between story "producers" (i.e., writers, designers) and "recipients" (i.e., readers, audience members) would likely facilitate pedagogical design writ large. As established below, taking a situated view may restructure the framework through which narrative is currently utilized and define its potential for shaping human understanding, goal adoption, and transfer.

Understanding Narrative

Storytelling and gaming are two areas where adopting an ecological perspective (i.e., *situated cognition*; see Barab and Roth, 2006; Young, 2004) might be especially helpful for delineating how and why learning occurs in particular formal and informal educational contexts. Much of the extant literature concerning stories and games is rooted in information processing and schema theory, and while this has been helpful for the purposes of deconstructing relationships between varying narrative elements (e.g., Burke's [1945] pentad of story elements, Bruner's [1991] 10 defining characteristics of narrative), it has also been limited in addressing the complex nature of producer-recipient-environment interaction.

Consider that stories, games, and other forms of narrative are rendered insignificant if the audience lacks the worldly experience to understand their underlying meaning in-context (e.g., a young child attempting to play and comprehend Irrational Games' [2007] *BioShock*). Narrative and environmental circumstance are connected by the relationships formed not just between the narrative's producer and recipient but also the producer's life-world, the recipient's life-world, and the medium in which the narrative is embedded. Even if the producer has written something with a specific instructional goal in mind, as with TaptoLearn's (2013) *Math vs Zombies*, the recipient's prior experiences fundamentally inform—or confound—the producer's intended interpretation. For example, a student playing *Math vs Zombies* might have a goal to see how close she could let the zombie get before transforming it,

thwarting the designer's goal to enhance math response speed. This suggests that stories must be approached as dynamic and context-driven to if we are to establish whether and to what extent narrative holds value as an effective instructional game mechanic.

Three Levels of Narrative

Narratives are traditionally organized around properties thought to be unique within specific categories—these might include genre (e.g., horror, comedy), tone (e.g., melancholy, hopeful), message (e.g., morals, lessons), or presentation type (e.g., book, stage production, film, video game). However, this organizational process generally ignores the situated and personal nature of producer-narrative and recipient-narrative interactions explained above, assuming a single narrative can only be understood through the producer's original life-world lens.

To counteract this problem, it would be prudent to refine and standardize narrative cataloguing across all media research. Yet, knowing that the organization process as currently utilized is ineffective, generalization based on perceived "unique" narrative properties would be unduly limiting. It would benefit researchers to focus instead on the nature of narrative interactions—that is, how narrative is perceived and acted upon by individuals—rather than emphasizing superficial differences between individual stories, genres, or story structures. The following section: (a) describes one way this can be accomplished by dividing narrative (game-based or otherwise) into three distinct levels of analysis that are fundamentally consistent across all genres, formats, and more; and (b) addresses the question: "How can narrative be optimally characterized with regard to impact on game-based learning?"

Level 1: Narrative-as-Designed

When an author or game designer begins producing content, they are guided by their intentions and experiences as part of the lived-in world. Their respective life-worlds inform a particular production goal and guide the conveyance of a particular message, theme, or idea by way of story structuring, diction choices, game mechanics, and formatting decisions. This can be accomplished directly, as with contemporary social media games and apps that ask story recipients if they would like to share their progress or discuss story content via social media websites (e.g., *Goodreads*, *FarmVille*), or indirectly, as with stories built to unfold as part of the recipient's interactive experience (e.g., *Star Wars: KOTOR*, *Mass Effect*, and Telltale Games' *The Walking Dead*). These two approaches define the primary purpose of the *narrative-as-designed*: to convey the producer's intentions to a particular audience and encourage receipt of an intended message.

Level 2: Narrative-as-Perceived

Even if the *narrative-as-designed* is well-produced, *Narrative: Level 1* holds little or no weight if members of the receiving audience re-shape the story based on their own situated goals and experiences, including unintentional misinterpretation, willful misdirection when describing the story to others, or modifying the story in subsequent editions or cross-media (e.g., book-to-film, game-to-book adaptations). A misanthropic teen might pick up a producer's work and read/play it under the assumption that the *narrative-as-designed* is a commentary on the triteness and unrealism of fairy tales. Perhaps he has recently suffered through a relationship break-up and believes that idealistic views of heroism and romance are overrated. Being inseparable from his experiencing of the story, his life-world will inevitably shape the lens through which he interprets the producer's work and influence the way he describes any underlying moral or thematic value.

Given the frequency with which narrative has been used for educational purposes, it is surprising that existing cognitive science literature does not address the divide between the producer's *narrative-as-designed* and recipient's *narrative-as-perceived*. In order for desired instruction to occur, a producer would need his audience to understand and interpret the *narrative-as-designed* as planned. Otherwise, recipients may transfer the *narrative-as-perceived* in such a way that they distort the producer's meaning, or worse, perpetuate misapplication among others. Understanding this relationship as bidirectional may help researchers and game designers develop an optimal generator set for conveying underlying morals, values, and ideas, something that could dramatically shape the development of game-based experiences for education.

Level 3: Narrative-as-Social Organizer

Narrative-as-perceived (i.e., *Narrative: Level 2*) has the potential to reinforce or mutate a producer's desired message. Both outcomes can be intensified as a function of social amplification—that is, the more recipients who interact with and around a given narrative, the greater the distortion (e.g., crowd sourcing, playing "telephone"). Importantly, though, the social organization that occurs in and around stories can foster the creation of entirely new, co-constructed narratives that exist exclusive of the original body of content. This can be referred to as *Narrative: Level 3*, or *narrative-as-social organizer*.

Even the most mundane stories have the potential to spawn peripheral social groups with shared goals and intentions. For example, a game designer could produce a roleplaying game in which the player is only able to direct their avatar to eat an apple. The narrative, by itself, could be presented by the producer to a group of recipients for further consideration. Emergent questions could drive discussion about the event being described (e.g., "Why did the avatar eat the apple?" "Why did it only eat one apple?"). This puts recipients in the position to write and share analyses of the game, build on the original (e.g., fan fiction, mods), and create clubs, online communities, and other organizations where they can chat, debate, and evaluate one another's contributions to the man-apple game.

Project TECHNOLOGIA: A Study of Narrative as Game Mechanic

In service of fostering cross-context critical thinking and researching the relevance of narrative in game-based learning environments, the staff of a large, public university Educational Technology graduate program developed a 24-week, dual alternate reality game (ARG)-roleplaying game (RPG) titled *Project TECHNOLOGIA*. Its plot follows the goings-on of a fictional space vessel, the Remmlar Array, helmed by a team of three administrators. Over the course of six three-part episodes, students are tasked with envisioning, designing, and stabilizing a new educational system through the wise integration of learning technologies as defined by the International Society for Technology in Education [ISTE] 2014 standards. This makes the target objective—based on balancing the needs and desires of a K-12 school district—the same from both narrative and instructional perspectives.

The program uses a combination of familiar game mechanics (e.g., roleplaying) and the Blackboard™ learning management system to guide players toward learning objectives and perspectives favorable for telling a story about learning as it unfolds. Its organization takes advantage of narrative in two distinct ways: first, players perform as "operatives" on a mission to save the world by fulfilling program-level learning objectives (e.g., visioning and implementing district-wide technology initiatives), and second, they perform as characters (e.g., school district technology coordinators) on a mission to save the game world, also by fulfilling program-level learning objectives (see also Slota, Ballestrini, and Pearsall, 2013). Additionally, they are encouraged to step out of the game to "tell" about their performances in the form of self-evaluation and group discussion—an intersection of *Narrative: Levels 1, 2,* and *3*. This multi-performance tiering attempts to capture the potential benefits of game-based instruction by encouraging metagame activities like the discussion of game mechanics and successful strategies for dealing with particular problems (i.e., *Narrative: Level 3*), ideally feeding back into reflection behaviors, academic achievement, and transfer.

Investigative Methodology

Between February and July 2014, 14 Educational Technology Master's students were invited and agreed to participate in *Project TECHNOLOGIA*, promoted as a story-driven game designed to help them more deeply engage with program content (12 female, 2 male; 12 Caucasian, 2 Asian-American, 1 Hispanic; aged 22 to 65 years). All of the participants were concurrently employed as practicing educators during the game's 24-week duration, and their collective career backgrounds included elementary, secondary, and post-secondary positions in rural, urban, and suburban districts.

At the game's outset, the players were randomly sorted into three teams—two groups of five and one of four. All teams were guided by separate instructional leaders whose responsibilities included posting new episodes based on a pre-established schedule, responding with non-player character actions and dialogue as needed, and maintaining a focus on the ISTE standards. Each *Project TECHNOLOGIA* participant was assigned a particular avatar/character that could speak, "think" (i.e., give third-person descriptions of avatar thoughts), and act within the story space (i.e., Blackboard™ discussion forums). Additionally, the participants were given login credentials for individual GoogleDoc-based Operative Thought Journals that could be used as repositories of personal perceptions and feelings about the game, outside influences on participation, and in- or out-of-game goals.

Player assessment was based on a combination of in-game dialogue, player-player and player-instructor interactions, and the Operative Thought Journals. After viewing an objective-based prompt posted by their instructional leader, players were expected to collaborate and act within the gamespace. This allowed the instructional leaders to evaluate skills (e.g., visioning) with emphasis on the complex challenges facing educational technology specialists. It also maintained focus on real world application by placing learners in complex, problem-rich contexts that required intellectual risk-taking and self-evaluation of learning (i.e., anchored instruction).

Throughout implementation, the instructional leaders used in-game player activities to guide story progression (e.g., non-player character dialogue, activities). The Operative Thought Journals, by contrast, were withheld from the instructional leaders to prevent player opinions from unduly influencing the story's structure and/or content

before it had been experienced in its entirety. Though the in-game learning objectives were identical across participant groups, story details (e.g., non-player character comments, behaviors) varied slightly based on the decisions made by each team (e.g., attacking a non-player character vs. assisting a non-player character) and/or the instructional leader's discretion (i.e., instructional approach, posting frequency). This was controlled through the use of pre-written "minus," "neutral," and "plus" versions of each in-game prompt, designed to anticipate particular types of player activity (e.g., helping vs. hurting a non-player character). Differences between the "minus," "neutral," and "plus" variants were primarily superficial (e.g., characters responding with different facial features, slightly different phrasing of ideas) and used to scaffold the participants closer to the program's ISTE standards. "Minus" variants were posted in response to anything the instructional leader considered a negative behavior, distraction, or clear lapse in activity; "neutral" variants were posted in response to adequate group progress toward the current learning objective; and "plus" variants were posted in response to exceptional progress toward both the current learning objective and overarching mission (i.e., *Project TECHNOLOGIA* as a whole). This highlighted how player actions (or lack thereof) had consequences as a function of storytelling but did not distract from the game's chief purpose.

Data Analysis

In order to explore how and to what extent particular narrative elements contribute to particular thoughts and responses among story recipients (Young et al., 2012; Young, Slota, & Lai, 2012), the investigator utilized grounded theory analysis (Glaser, 1998; Young et al., 2012). Analysis unfolded as a nine-step process beginning with the import of all 274 Blackboard™ discussion posts and 14 Operative Thought Journals into QSR NVivo 10 (approximately 44,400 words excluding the pre-written, episodic narrative prompts). Given the contextual differences between the two (i.e., co-constructed in-game vs. individual/internal, respectively), the investigator initially chose to treat them as mutually exclusive resources in order to identify common word, phrase, and concept usages unique to each (e.g., "collaboration," "goal," "I would like to…"). Due to the sheer volume of player-generated content embedded in both discussion board posts and Operative Thoughts Journals, the data was further parsed into composite idea units comprised of individual comments, statements, and/or questions. These idea units were occasionally shorter than a full sentence but never more than three sentences in length. Importantly, they were analyzed in the presence of the preceding and following idea units to minimize the loss of vital, context-dependent information (e.g., author tone, intention).

The investigator tracked commonalities between idea units throughout the reading process via open coding. Refinement with QSR NVivo 10's coding toolkit resulted in 11 unique nodes across the 14 Operative Thought Journals and 11 across the Blackboard™ discussion posts. These nodes were re-applied to axially code all collected data and identify any categorical themes emergent across both sources (i.e., Operative Thought Journals examined alongside corresponding in-game dialogue). This laid a foundation for unpacking how and why particular individuals interacted with the narrative in particular ways, feeding back into the investigator's goal to determine how narrative could be defined with respect to its specific affordances for supporting game-based learning.

A second researcher reviewed approximately 20% of the total data using the coding scheme generated through the primary investigator's open and axial coding. This independent evaluation of code consistency, utility, and overall trustworthiness (i.e., peer debrief) yielded roughly 74% overlap with the primary investigator's original code assignments. Inconsistencies between the two were used to review the primary investigator's findings and identify how code clarity, precision, and specificity could be improved. The process resulted in minor modifications to a small number of code definitions, but no codes were judged in need of elimination or replacement.

Results: Categorizing the Affordances of Narrative for Game-Based Instruction

1. Conveying Context, Chronology, & Content

Participant interactions throughout *Project TECHNOLOGIA* suggest that instructional utilization of the Context, Chronology, & Content affordance of narrative might be especially valuable for establishing perceptible cross-context invariance that can facilitate transfer. In the case of instantiating a new school district technology initiative, event sequencing and interaction—including visioning, explaining technology goals to others, determining which tools optimally fulfill the original vision, and dealing with issues associated with rollout—is critical to success (Slota, Young, & Travis, 2013). However, several players entered the program with overly simplistic views on the relationship between visioning, tool selection, and communication among peers. Some began their participation already having specific technologies and other preconceived notions of what should happen in mind. This led them to somewhat naively work backward to identify philosophical foundations that would retroactively support their tool choices and/or rush to action without offering an underpinning philosophy whatsoever. Others openly acknowledged their misunderstandings and confusion with how technology coordinators form and execute district initiatives.

Given that all participants were in-service educators who had experienced at least a small amount of ineffectual initiative enactment in their own districts, misunderstanding and confusion would normally worry a program administrator. Yet, as the game progressed, interactions within the narrative environment provoked the identification of overlap between the game and their real world experiences. Many times, this came in the form of guidance from non-player character actions or statements. The game's story organization and context clues seem to have provided at least some of the information needed for learners to identify how and to what extent their particular attitudes, approaches, and behaviors would result in particular outcomes. The evolution of responses, too, highlighted how participant thinking may have become better-rounded as a result of exposure to multiple non-player character perspectives (e.g., economic equalization, democratization, social competency). Altogether, this lends credence to the notion that narrative has the potential to provide important information about Context, Chronology, & Content that puts program learning objectives at the forefront of player thinking and discourse.

2. Engaging & Motivating

Story producers often make specific linguistic choices they anticipate will resonate with as much of their target audience as possible. This can be broadly referred to as narrative relatability, or the level at which a particular audience member will detect invariance between the given narrative and his or her experiences with the lived-in world. The effect is commonly observable in situations where the story recipient demonstrates parasocial interaction with a particular character (i.e., social surrogacy) but that character is unexpectedly and dramatically changed or killed as part of the plot—for example, Ned Stark's execution in Martin's (1996) *A Game of Thrones* or the death of Professor Dumbledore in Rowling's (2005) *Harry Potter and the Half-Blood Prince* (see Cohen, 2004; Derrick, Gabriel, and Hugenberg, 2009).

Throughout *Project TECHNOLOGIA*, several participants commented on how non-player character dialogue shaped their on-going perceptions of right, wrong, and indifference within the game's context, engagement with the story, and motivations for action. This included placation for the sake of avoiding conflict, frustration, testing boundaries, considering future action, amusement, intrigue, and changes to personal philosophy. Though none of the characters in *Project TECHNOLOGIA*'s story experience the surprising or emotionally taxing outcomes of Dumbledore or Ned Stark, these narrative-specific responses suggest that even relatively minor story elements are capable of triggering emotional connections between text and reader (e.g., characters, settings). This, in turn, can encourage reader investment and receptiveness to particular thoughts, messages, or ideas. Instructors who use narrative this way may be able to capitalize on emotional investment for the purpose of heightening engagement and motivation to interact with particular ideas or themes embedded within the game narrative.

3. Educating Intention & Attention

Whatever the benefits of engagement and motivation, emotional attachment alone is not enough to induce transfer. However, if applied toward tuning perception, it may be possible to shape intention and attention such that recipients will be able to recognize invariance between contexts, adopt new goals, and take action to achieve them (i.e., an intentional spring; see Shaw, Kadar, Sim, and Repperger, 1992). This effect may be amplified via narrative formats that provide insight into how or why a favored character has adopted particular goals, attended to particular environmental elements, and made particular choices (i.e., first-person perspective). If an emotional bond is laid as a foundation for "telling," a more knowledgeable other (e.g., classroom teacher) could discuss the nature of the beloved character's thoughts, opinions, and actions such that the learners will be more likely to perceive similar opportunities for action across contexts.

This occurred at various points throughout *Project TECHNOLOGIA*, with some goal adoption events unfolding within the context of the story and others within the real world. Interestingly, both within- and outside-narrative intentions emerged in response to particular non-player character statements or actions, often to counteract what a non-player character was attempting to do. Players would occasionally assert majority agreement to convince others to adopt similar intentions, though many goals emerged with a highly self-oriented rationale. If, as suggested here, the narrative can help learners perceive invariance between in-game and external experiences, it may be possible to seed up-to-date technological, pedagogical, and theoretical information into live classrooms by way of story-driven games—something viewed as quite difficult within professional development and pre-service teacher education circles. This will require more extensive empirical study but has promise for being an alternative approach to more traditional pre- and in-service teacher workshops and coursework.

4. Creating Opportunities for Co-Action

Participants in *Project TECHNOLOGIA* frequently commented that emergent opportunities for narrative co-action were crucial to participation, growth, and success throughout the program. These statements emphasize the perceived importance of collaborative action within the narrative for memorability and the creation of additional learning opportunities. They also serve as a foundation for facilitating reflection on how and why particular actions unfolded in response to story elements as well as which technology coordinator actions are most closely associated with success and failure in real world K-12 environments. While the instructional leaders may have posted a particular prompt with a specific goal in mind, the players clearly co-acted to attribute meaning, define emergent properties of the story, and interpret how to act on those properties given varying understandings about foundational narrative elements (e.g., characters, plot, theme, tone). Producer-driven storytelling is one way to encourage abstract critical thinking (i.e., *Narrative: Level 1*), but, as demonstrated in *Project TECHNOLOGIA*, it can also manifest as alternative visioning (e.g., providing new insights into the original narrative) or the presentation of alternative points of view among players (i.e., *Narrative: Levels 2* and *3*).

Peer-to-peer modeling likely fits under the same umbrella. While non-player characters seldom had an obvious impact on *Project TECHNOLOGIA* participants—save for a few outbursts of frustration over stubbornness—responses by some players appeared to affect the way in which others understood, interpreted, and interacted with the narrative. Those with minimal in-game participation were still capable of reading what others were doing (i.e., lurking) and provided an authentic audience outside of each team's instructional leader. Additionally, the most active students could highlight their thought processes knowing that others might identify and adopt similar attitudes along the way. Given that roleplaying can convey information about what may or may not happen as a result of particular actions in particular contexts (e.g., parables, fables), lurking could provide even non-active learners with information about the narrative environment or real world that they could not or chose not to experience first-hand. Though this relies on a number of factors, including recipient attention, ability to reproduce the behavior, and motivation, the interaction between narrative, context, and recipient could have fostered vicarious reinforcement and the development of a legitimate peripheral learning environment (e.g., Lave and Wenger, 1991).

5. Nurturing Creativity

Creativity literature frequently describes two major components of creativity: novelty and task appropriateness (Guilford, 1950). The Four-C Model, in particular, explains how and why these components intersect to produce what are commonly considered "creative acts" (see Beghetto and Kaufman, 2007). Narrative production organizes thinking and behavior for—at the very least—mini-c and little-c creative acts and may be why narrative has persisted so long across evolutionary history. It has enabled humans to elaborate on particular thoughts and ideas such that others can understand complex and abstract concepts (i.e., teaching). In *Project TECHNOLOGIA*, mini-c and little-c creative acts regularly emerged as part of the co-active writing process. This included the introduction of novel, external goals as well as references to external, trans-media narratives. Furthermore, some participants actively sought opportunities to discuss how they could spur change in a deeply resistant educational system.

Imaginative, cross-context thinking could play a major role in limiting the perpetuation of test-oriented traditional direct instruction and lecture. As highlighted above, *Project TECHNOLOGIA* participants demonstrated content mastery by identifying and associating orthogonal concepts (e.g., film, personal stories) with what they experienced in-game. Utilized in conjunction with well-devised instructional guidance, this could lead to whole-group analysis of discrete social and cultural barriers associated with the planning of new educational technology initiatives. Direct instruction from a skilled teacher educator or administrator could theoretically draw attention to the same basic concepts, but co-action surrounding a shared, co-developed narrative appears to lay a fertile grounding for student exploration, debate, and creativity over and above content—an extension of improved student agency and ownership over their learning. This is a very different framework from the "gamification" approach of implementing simplified behavioral approaches to learning as games in the classroom. As a result, it seems feasible that the development of better and more effective stories may significantly move learning scientists toward a deeper understanding of how particular types of narratives interact with particular students and instructional settings to yield optimal learning outcomes.

Conclusions

This study is a first step toward resolving the two questions posed at the beginning of this piece as well as Young et al.'s (2012) goal of identifying how and why particular players interact with particular games in particular ways under particular conditions. Further investigations should target the ways in which varied narrative formats (e.g., script, novel, game) influence motivation and achievement in addition to how particular storytelling mechanics (e.g., tone, character development) individually and collectively convey content, improve engagement, and pro-

mote goal adoption. Like a certain heroic plumber, we must act promptly but with enough caution to ensure we do not dismiss the castle of our betrothed in favor of another that merely plays host to a hostile turtle. That is the only path to conquering the field of game-based learning and, of course, living happily ever after.

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