

EDUCATIONAL ALTERNATE REALITY GAMES

A LITERATURE REVIEW

An alternate reality game (ARG) is a new type of social gaming experience. Starting in 2001, ARGs emerged as marketing promotions for movies and consumer products, but recently ARGs have become recognized as effective educational activities.

This chapter is a review of literature that relate to ARGs and their educational benefits. In particular, the literature pertains to the three main research areas that this research project addresses: (a) the definition of an educational ARG, (b) the pedagogical benefits of an educational ARG, and (c) the features that could be included in an educational ARG instructional design model. To address these areas, this chapter covers information about the following: background and definition of an ARG, pedagogical benefits of an educational ARG, and instructional design models for developing an educational ARG.

Defining an Alternate Reality Game

An investigation of whether an ARG can be used as an effective educational tool begins with a proper definition of an ARG. A review of the literature about completed ARGs and their various features can provide a clear understanding of the ARG genre.

Completed Alternate Reality Games

The Beast. As a promotion for the movie *Artificial Intelligence: A.I.* in 2001, *The Beast* was one of the first highly successful ARGs (Kim, Allen, & Lee, 2008). *The Beast* started off with movie advertising posters with hidden clues that sent people on a puzzle-solving expedition through the real and online worlds to figure out specific information related to the movie. Eventually, an estimated three million people either played or followed *The Beast* in less than six months (Kim, Allen, et al.). The core group of players named themselves *The Cloudmakers*,

which eventually grew into a community of over 7,000 actively playing members, whose collective intelligence was so powerful that it required the designers of *The Beast* to have to completely alter the game structure (McGonigal, 2003).

I Love Bees. Three years after *The Beast*, the producers of the video game *Halo 2* commissioned the *I Love Bees* ARG to serve as a pre-release promotional activity (Kim, Lee, Thomas, & Dombrowski, 2009). The ARG started with various game industry people receiving a package containing a jar of honey and a website address (www.ilovebees.com) (Kim, Lee, et al.). At the same time, onscreen advertisements for *Halo 2* contained flashes of the same website address (Kim, Lee, et al.). The website held clues to a story about an alien who was marooned on earth and needed the ARG players' help to escape back to its own universe. The ARG contacted players via pay phones, cell phones, email, and other media to unlock story segments (Kim, Lee, et al.). When the game finally concluded, players were invited to events where they were able to play *Halo 2* before the official release of the video game (International Game Developers Association [IDGA], 2006).

World Without Oil. In April 2007, three years after *I Love Bees*, the *World Without Oil* ARG simulated a real-world oil crisis and asked players to share their reactions in the form of blogs, videos, images, and any other online media (Ash, 2008). Over the course of 32 days, with each day simulating one week, the game attracted more than 1,900 players and 60,000 observers (World Without Oil, 2007). *World Without Oil* is significant in that it was the first large-scale ARG that had an educational purpose (Ash). After the completion of the game, two educators teamed up to create a series of lesson plans based on *World Without Oil* to use in classrooms (Ash). Despite its educational purpose, *World Without Oil* has been criticized in the ARG

community as not being an authentic ARG because the game did not contain a collaborative storyline with a trail of puzzles to solve (Brackin, 2008).

Alternate Reality Game Features

The aforementioned ARGs have features that are descriptive of the ARG genre. This section contains a review of these features in order to present the basic fundamentals of an ARG. These features include an ARG's game environment, game type, social network, collaborative storytelling, use of new media and technology, and pervasive and emergent gameplay.

Game environment. Although technically a form of massive multiplayer online game (MMOG), ARGs are an entirely new genre of gaming (IGDA, 2006). In MMOGs, large number of players participate in an online game; however, ARGs differ from MMOGs in that the typical MMOG takes place inside a single program or website, whereas an ARG takes place anywhere in the entire online and real worlds (IGDA). Brackin (2008) has described an ARG as a blending of online interactive fiction, online social networking communities, and online interactive games. However, because part of the ARG experience occurs in the real world, ARGs are not just an online only experience. McGonigal (2003) has described the ARG environment as less of a virtual reality world, such as *Second Life*, and more of an alternate realty world that takes place in both the real and online environments. McGonigal has used the term *immersive gaming* to describe the realism that players experience while participating in an ARG. In fact, the well-known ARG phrase, "this is not a game" (McGonigal, p. 2), refers to the ARG players' believing that they are not actually playing a game but are instead participating in a real-life experience (McGonigal). Brackin has identified immersive elements as a critical component of ARGs. For example, in the 2005 ARG, *Art of the Heist*, the compelling storyline, engaging puzzles, and live events were all immersive elements critical to the game (Brackin).

Game types. The International Game Developers Association has identified five different types of ARGs: promotional, grassroots, productized, single-player, and educational (IGDA, 2006). Promotional ARGs are designed to promote a product or event and are the most high profile type of ARG. Grassroots ARGs are smaller productions that are often funded and designed by one person or small groups and are generally focused on a specific interest area. Productized ARGs are ARGs packaged as commercial products, such as the off-the-shelf game, *Majestic*. Single-Player ARGs are designed for individual play, but because single-player ARGs do not contain the social experience that defines an ARG, this may not be a true sub-genre. Finally, educational ARGs are designed to educate or train people in schools or organizations. In contrast to the five types defined by the IGDA, Brackin (2008) has divided the ARG genre into three main sub-genres: commercial ARGs (those with a stated corporate or commercial agenda), non-commercial ARGs (medium- to large-scale ARGs with no commercial agenda), and grassroots (same as the IGDA's sub-genre definition).

Social network. Brackin (2008) has called social networking "the backbone of ARG" (p. 7) because an ARG is mostly a social experience. He has described an ARG social network as having a self-organizing structure, which refers to the natural tendency of the players to organize themselves into casual, active, or enthusiastic player roles. Kim, Lee, et al. (2009) have defined ARGs as "digital social experiences" (p. 1), which require people to form social networks to collaborate on problems and activities. Kim, Lee, et al. have explained that social networks not only allow players to collaborate but also motivate the players through peer encouragement and recognition.

As with any social networking experience, participation is vital to the success of an ARG (Kim, Allen, et al., 2008). A successful ARG requires that people build communities which lead

to the formation of a powerful collective intelligence that can find solutions as the ARG evolves (McGonigal, 2003). In fact, many ARG designers create puzzles that no single individual can solve, such as one in which clues are distributed to different locations or in different languages, so that players must build communities in order to win the game. An interesting phenomenon about ARG social networks is that the participation in these networks is purely voluntary (Kim, Allen, et al.). No one pays the players to participate in ARGs, yet people spend long hours collaborating, solving puzzles, and furthering a storyline simply for their own personal enjoyment. Nonprofit and business organizations that rely on volunteer help can learn from ARGs in order to utilize the power of a social network of volunteers (Kim, Allen, et al.).

Collaborative storytelling. If the social network is the backbone of an ARG, the collaborative storytelling is the glue that holds an ARG together because it is the story that ties together all the elements of an ARG (Kim, Lee, et al., 2009). A main goal of an ARG is to create an immersive storyline. A compelling plot moves an ARG forward and can attract and retain a large number of players (Brackin, 2008; Kim, Allen, et al., 2008). Today, storytelling is becoming more interactive and participatory, and this new type of storytelling is likely to replace more passive entertainment activities, such as reading newspapers or watching television (Kim, Lee, et al.).

An ARG storyline has some unique characteristics. First of all, a well-written ARG storyline is easy to understand so that the story can be easily explained to new people and allow news of the ARG to spread virally (Kim, Allen, et al., 2008). An ARG story unfolds in real-time (Brackin, 2008) and is not bound by any one particular media because the story is communicated through all types of media, such as email, video, and websites (Kim, Lee, et al., 2009). Finally,

the ARG story is always divided into segments so that players can collaboratively discover or help create each part of the story before moving on to the next story segment (Kim, Lee, et al.).

Through the collaborative process of solving puzzles and completing activities, the players control how fast the story moves along and the direction the story takes (Kim, Lee, et al., 2009). Successful ARGs allow players to control the story; unsuccessful ARGs have stories that can lead nowhere or are purposely derailed into chaos in a process referred to as “gamejacking” (Brackin, 2008, p. 52). The ARG design team includes a *puppetmaster*, who is usually one person and is responsible for controlling the storyline (Brackin; Kim, Lee, et al.). The continuous give and take between the puppetmaster and players is an essential element of collaborative storytelling in an ARG (Brackin). Kim, Lee, et al. have likened the interaction between the puppetmaster and players to jazz because the story requires constant improvisation as it develops in usually unforeseen ways.

Use of new media and technology. The emergence of new media, such as user-created videos, text messaging, blogs, wikis, discussion forums, and social networking sites, has made possible new social entertainment activities such as ARGs (IGDA, 2006). An ARG is defined as being multimodal and can utilize practically any available media available, online and offline (IGDA; Kim, Lee, et al., 2009; Thomas, 2006). The popularity of ARGs is fueled by the willingness of players to utilize several different media and technologies simultaneously (IGDA). This use of different media and technologies allows ARG players to receive constant feedback from other players and the game itself (Kim, Lee, et al.). In addition, the variety of media provides additional ways to draw new players into the game and lets these new players have more communication options (Kim, Lee, et al.).

Pervasive and emergent gameplay. An ARG is pervasive in that the game is being played anytime and anywhere (IGDA, 2006; Thomas, 2006). Because an ARG is played nonstop throughout its duration, the game is always in a state of flux with no set states (Thomas). Contributing to the pervasiveness of the game, occasionally in an ARG, the game will contact players at any time of the day or night and via any communication medium (Thomas).

Additionally, ARGs have components of emergent gameplay. Brackin (2008) has described emergent gameplay in ARGs as the evolution of a game that does not follow a specific path. Because the ARG players are a part of the actual game itself, emergent gameplay occurs because of the variability involved in the various players' decisions that take place throughout the course of the game. The emphasis of the game therefore becomes the journey through the game instead of the final outcome (Thomas, 2006).

Pedagogical Benefits of Alternate Reality Games

Until now, most ARGs have not been specifically developed for educational purposes. However, ARGs have the potential to be effective learning activities. An educational ARG should combine the basic fundamental gameplay of traditional ARGs with relevant learning principles and theories, such as active learning, collaborative learning, scaffolding, situated learning, problem-based learning, multimodal learning, and motivation. This section examines the potential pedagogical benefits of these learning principles and theories as they pertain to an educational ARG.

Active Learning

An ARG promotes active learning because the gameplay requires players to be constantly engaged in activities such as solving puzzles and collaborating in discussion forums. Also, ARG players are creators of media, such as blogs, wikis, and online videos, instead of just consumers

of media, and this “player as author” (de Freitas & Griffiths, 2008, p. 16) characteristic encourages active learning (de Freitas & Griffiths). Another way that an ARG promotes active learning is by making the player aware that the player-created content has a direct effect on the evolution of the game. The ARG game designers use the player-created content to design new plotlines or activities (Whitton, 2008). The awareness that their involvement is critical to the evolution of the game encourages players to maintain their activity throughout the entire game. An ARG also promotes activity among players by requiring them to work collaboratively during the game.

Collaborative Learning

Collaborative learning occurs in an ARG through the many group puzzle-solving activities involved in the gameplay. Much of the learning in an ARG occurs socially through the community of players, with established players supporting and mentoring new players (Thomas, 2006; Whitton, 2008). An ARG also promotes collaborative learning through players creating learning content for other players, forming a peer-to-peer type learning community (de Freitas & Griffiths, 2008). The communication between players in this peer-to-peer type community occurs mainly through the use of both in-game and public discussion forums (Brackin, 2008). Another way that an ARG can promote collaborative learning is by dividing up related game-specific knowledge among different players so that the players have to share information with each other in order to succeed (Dunleavy, Dede, & Mitchell, 2009).

Scaffolding and the Zone of Proximal Development

Collaborative learning often requires the use of scaffolding techniques. An ARG provides an environment for scaffolding because the community of players provides helpful support for newer players (Moseley, 2008; Squire & Jan, 2007; Whitton, 2008). In a gaming community,

players can recognize other players' expertise in specific areas (Squire & Jan). This recognition of expertise can enhance players' scaffolding opportunities during the game. The ARG itself can also provide scaffolding for players and help identify players' zone of proximal development, which is the difference between what a person can learn alone and what a person can learn with guidance (Vygotsky, 1978). An ARG can be effective at keeping a student in his or her zone of proximal development by first storing information about students and then providing appropriate challenges (Luckin, 2001).

Situated Learning

An ARG provides a situated learning environment because the game creates a real life context in which students can learn (Whitton, 2008). For example, in the *World Without Oil* ARG, learning occurred in the context of a world during an oil crisis (World Without Oil, 2007). An ARG allows players to learn through meaningful experiences in a time and place that is relevant to them (Thomas, 2006). The support that learners receive should also be relevant. Bruckman (2000) has stressed the importance of situated support, in which the context of learner support is just as important as the support content.

Problem-based Learning

The puzzles in an ARG promote problem-based learning for the players (Whitton, 2008). Moseley (2008) has noted that in an ARG, players often conduct lengthy research on unfamiliar topics in order to solve puzzles. Moseley has also pointed out that ARGs could allow students to select the starting level of problems, thus making problem-based learning more effective. Problem-based learning is often aided by the use of multimedia.

Multimodal Learning

Problems that utilize multimedia help to promote multimodal learning. Mayer (2001) has found that learning retention and transfer improves with the use of multimedia. An ARG promotes learning over multiple modes (Thomas, 2006). In particular, the visual and auditory media that the players and the game designer create are the primary modes through which students can learn in an ARG. The effective use of multimedia in an ARG can be a motivating factor for students to progress through the game.

Motivation

An ARG is motivational because the gameplay provides a series of stimulating and satisfying activities. Reiber (1996) has noted the importance of including voluntary, intrinsically motivating, and engaging play in a learning environment. In an ARG, players have high levels of motivation because of their length and depth of engagement in the game (Moseley, 2008). Dunleavy et al. (2009) have found that previously disengaged students become very engaged when placed into a gaming environment. Moseley has described three areas that motivate ARG players: solving puzzles, collaborating in communities, and hearing about new storyline developments. Similarly, players can become engaged in ARGs through four types of actions: completing, competing, curiosity, and communicating (Whitton, 2008). Playing in an ARG also increases motivation for students because of the positive emotions, such as pride and satisfaction, they experience from participating in the game (Markovic, Petrovic, Kittl, & Edegger, 2007; McGonigal, 2008).

The pedagogical benefits mentioned in this section are the reasons why instructional designers should develop educational ARGs. In regards to the actual development process,

instructional designers would benefit from the existence of a game design model of an educational ARG.

Educational Alternate Reality Game Design Model

Alternate reality game designs are not only complex but also are continuously evolving. A game design model for a traditional ARG can help people understand the overall design and gameplay of a traditional ARG. Similarly, an instructional design model for an educational ARG can help individuals to understand the educational aspects and learning goals of an educational ARG. However, because ARGs are such a new entity, there is no known literature at the current time that pertains specifically to an educational ARG instructional design model, although some literature exists about models for traditional ARGs and educational games. This section contains a review of the existing game design models and possible features that could be included in an educational ARG instructional design model.

Existing Game Design Models

Experiential gaming model. Kiili (2004) has created a model for educational computer games based on game design, experiential learning theory, and flow theory. Game design refers to the series of linked challenges that keep players motivated and engaged (Kiili). Experiential learning occurs when a person learns from direct experience and reflection of that experience (Kiili). Flow theory describes the feeling of *flow*, which is a sensation of complete engagement in an activity and refers to an optimal experience (Csikszentmihalyi, 1975). Kiili's experiential gaming model has combined game design with experiential learning in order to facilitate the flow experience.

International Game Developers Association (IGDA) model. Phillips (2006) has described IGDA's model of an ARG as a blending of exposition, interaction, and challenges. Exposition

refers to the narrative storytelling element that is conducted through blogs, wikis, websites, and other media (IGDA). An ARG typically is heavier in exposition than traditional video games, and creating the exposition is a main part of the gameplay (IGDA). Interaction is possibly the defining characteristic of an ARG (IGDA). Interaction refers to the players interacting via chat, email, telephone, or other communication media with not only other players but also the in-game story characters (IGDA). Challenges in an ARG consist of puzzles, games, and other real-world and online activities (IGDA). Although exposition, interaction, and challenges are three separate elements of this model, during actual gameplay, these elements often overlap (IGDA). A visual representation of this model might look a Venn diagram with three overlapping circles that represent each element.

Circular model of ARG development. Brackin (2008) has developed this model based on the 42 Entertainment (n.d.) inverted pyramid model of player participation in an ARG. In the inverted pyramid model, players are grouped into three levels: (a) casual player group, which has the most people and therefore makes up the base (top) of the inverted pyramid, (b) active player group, which makes up the middle of the inverted pyramid, and (c) enthusiastic player group, which has the least number of people and makes up the tip (bottom) of the inverted pyramid (42 Entertainment). The circular model of ARG development builds on this inverted pyramid model by taking into consideration the sub-activities or sub-games of an ARG (Brackin). A visual representation of the model resembles a pie chart, where each pie segment depicts a single trailhead (point of entry into an ARG) or storyline, and the size of each pie segment indicates the relative importance of a trailhead or storyline (Brackin). Because the shape of the model is a circle, the model can accommodate any number of different trailheads or storylines. Dena (2008) has described ARG *content tiering* as a system that provides for different trailheads by allowing

the game producers or players to create separate content for the three different player levels (casual, active, and enthusiastic). Brackin has noted that in addition to presenting a visual representation of the anatomy of an ARG, the circular model of ARG development shows the various paths that go from casual to enthusiastic player in the form of arrows on each pie segment. Furthermore, Brackin notes that two or more overlapping circles can visually represent parallel or sequel games that have the same player base or common storylines.

Additional Model Features

An effective educational ARG instructional design model should be able to show the structure and process of an ARG and incorporate various educational components. The three models described in the previous section provide a foundation for building an effective educational ARG model. The following are additional features that could be incorporated into an instructional design model for an educational ARG.

Learning goals and objectives. An educational ARG instructional design model should include learning goals and objectives. Carson, Joseph, and Silva (2009) have reported that smaller ARGs, often referred to as *mini-ARGs*, are designed to teach specific goals and objectives. However, even if an ARG has specific learning goals and objectives, the open-ended nature of the game means that players will sometime define other learning goals for themselves (Connolly, 2009). In addition, because of the emergent nature of the game, the ARG designer needs to occasionally adapt the design based on player inputs in order to guide players toward the learning goals and objectives (Carson et al.). An educational ARG instructional design model should be able to incorporate these various situations related to learning goals and objectives.

Assessment. An educational ARG instructional design model should also incorporate assessment activities. Chin, Dukes, and Gamson (2009) have advocated collecting assessment

data during a game activity. Connolly (2009) has noted that teachers can use tests during or after activities. Chin et al. and Connolly have suggested that instructors can also use pre- and post-game tests to assess learning. Overall, however, collecting assessment data in games is difficult because of the open-ended nature of game activities (Chin et al.). Also, because group work is a common feature in ARGs, there is also the difficulty of assessing individuals in a group setting. Pitt (2000) has noted that individual assessment in a group setting is difficult because students may be motivated more by grades than by teamwork. Individual assessment in a group setting may be made easier if an ARG can automatically track and record collaborative performance data (Connolly). Another issue that complicates the assessment process is the fact that assessment does not always come from a teacher but instead sometimes comes from other players or the game itself (Connolly).

Scoring system. An ARG can utilize a scoring system in which players receive points for completing various tasks, individually or in a group. Displaying the players' points online for other players to view not only can provide feedback to players but also can promote competition (Carson et al., 2009). Markovic et al. (2007) have demonstrated the effectiveness of using a class leaderboard in an augmented reality game.

Game and activity timelines. An online timeline can show players' progress in an ARG as the players complete each activity. Carson et al. (2009) have noted that such a timeline can provide organization of the game for players and groups.

An educational ARG instructional design model can conceivably incorporate other elements, such as player characteristics and state academic standards. In the future, new model features may arise as the ARG genre continues to evolve.

Discussion

The purpose of most of the existing literature about ARGs is to provide a description of completed ARGs, such as *The Beast* and *I Love Bees*. Some literature contains information about various educational ARG pedagogical benefits, which are described earlier in this chapter. In regards to an educational ARG instructional design model, a search for existing literature did not reveal any known literature of models specific to an educational ARG. However, the existing literature contains two design models of general ARGs and one educational games model, both of which may apply indirectly to an educational ARG. Overall, the existing literature provides a solid foundation for creating an effective educational ARG instructional design model that incorporates various learning principles and theories.

Missing Literature

Because ARGs are a relatively new phenomenon, the literature about ARGs is fairly limited. There is even less literature about educational ARGs. Researchers and designers of educational ARGs may benefit from new studies about possible pedagogical benefits. Also, more literature is needed about ARG design modeling and other educational features that may be incorporated into an educational ARG instructional design model.

Future of Educational Alternate Reality Games

Alternate reality games are a new genre of games that are not only fun and engaging but also may be educational. Over the past few years, designers have started to create the first ARGs with specific educational purposes. Educational ARGs are beginning to emerge in both K-12 education and organizational training programs (Carson, Joseph, & Silva, 2009). Eventually, more educators may start to become familiar with the educational potential of ARGs. Instructional designers may then be asked to design new features and uses that may expand the

pedagogical benefits of educational ARGs. As ARGs continue to evolve in the future, there may be the need for more extensive research about their educational effectiveness.

The Finding Identity Alternate Reality Game

The results of this project, the *Finding Identity* ARG, will provide additional information for future researchers of educational ARGs. Specifically, this project may be able to give educational ARG researchers insight into the application of the various learning theories and principles that were highlighted in this chapter. In addition, because this literature review has found there to be a lack of an instructional design model for an educational ARG, evaluation of the research methodology of the *Finding Identity* ARG may promote the development of such a model in the future.

The following chapter describes the research methodology of the *Finding Identity* ARG project. The methodology includes details about the development of a game prototype, the evaluation of the prototype, and the subsequent implementation of the ARG. Following chapter three, the remaining two chapters describe the design, development, implementation, and evaluation of the *Finding Identity* ARG along with some concluding thoughts and recommendations for the design of future educational ARGs.

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