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Abstract

The Department of Information Science, University of Pretoria offers a unique undergraduate and post graduate programme in Multimedia which focuses on aspects of IT that require both creativity and logical thinking. These skills enable students to build and design multimedia products, thus consolidating technology and visual design. One of the Honours (fourth year) programme modules requires the students to consolidate and use all knowledge and skills obtained in the three year degree to successfully design and implement an Alternate Reality Game (ARG).

An ARG is a game that uses interactive fiction, integrated with reality, as its narrative and context. The game is played through interacting with multimedia. The players form a community that work together to solve puzzles and develop the narrative. The creation and design of puzzles and the narrative is up to the group of students and ranges from fictional to real life scenarios.Three ARGs have been designed and implemented by the Multimedia fourth year students in the last three years, all with varying success.

Within an African context, many students do not know how to use an academic library, as they often come from environments with poorly equipped school libraries. The University of Pretoria addresses this problem though a compulsory Information literacy module in Academic and Information Management. It is envisaged that the following ARG will supplement the skills taught to the students in this module through their participation in the game. This paper will address the design and use, as well as advantages and challenges, in utilising an ARG for teaching purposes.

Keywords

Alternate Reality Game, library literacy, information literacy, transliteracy, games, gamification

1. Introduction

Multimedia technologies have become indispensable within the Information Society. These technologies affect our everyday lives and these affects manifest themselves in areas such as industry, healthcare, entertainment, and education, to mention a few. As Information Communication Technology (ICT) evolves, these technologies become more sophisticated and thereby elevate the skill level required to effectively utilise these new technologies. To partake in, and benefit from, these new technologies, students need to be transliterate and have efficient skills to benefit from and participate in the Information Society (Ipri, 2010). This proficiency not only encompasses traditionally viewed information and computer literacy skills but also the ability to cope with the variety of multimedia information (images, text and audio-visual) that continuously flood the global networks (Livingstone, 2004).The Department of Information Science, University of Pretoria, offers under- and post graduate programmes in Multimedia which provide students with these required skills. This paper focuses on one of the Honours (fourth year) programme modules that requires the students to consolidate and use all the knowledge and skills obtained in the three year undergraduate Multimedia degree to successfully design and implement an Alternate Reality Game (ARG). It is envisaged that the ARG designed by the Multimedia students will supplement the library literacy skills taught to the students in their Academic and Information Management module through their participation in the game.

2. What is an Alternate Reality Game (ARG)

First and foremost, an alternate reality game or ARG is a game. A game is a collection of activities guided by artificial rules to overcome obstacles and to achieve specific goals (Salen & Zimmerman, 2003; Szulborski, 2005). These activities have meaning in the context of the game, but may appear completely inane outside of the game. Alternate reality games differ from normal games in the sense that the context of the game is your reality. The reality created for the game can seamlessly merge with your current reality and the activities you participate in can be very believable. To create this artificial reality, an ARG makes use of interactive fiction. Every time a player participates in actions within the ARG, the narrative of the ARG is driven forward based on these actions. To peak the initial interest of the players a rabbit hole is used. A rabbit hole is the initial site, page, or clue that brings a player into the game (Unfiction inc, 2002).

The obstacles in an ARG are usually a lot more complex than normal game-based problems such as "kill the bad guy" (IGDA Wiki, 2011). ARG obstacles or puzzles can require an intricate knowledge of chemistry, engineering, ciphers, or encryption to mention a few examples. It is unlikely that a single player will have all these skills. For this reason ARGs require the collaboration

of game players collectively solving the puzzles (IGDA Wiki, 2011). This collaboration needs to be facilitated by a technological platform. The integration and usage of multiple types of media and platforms makes an ARG a different experience from playing a traditional or digital game. An ARG furthermore makes use of Puppet Masters (PMs). These PMs are responsible for the monitoring of the players and responds to player interaction. The PMs are often the designers of the ARG. PMs can also add to the narrative based on the actions of the players.

The first ARG "The Beast" was designed for marketing purposes and was designed by Microsoft in 2001 (Unfiction inc, 2002). Since then numerous international ARGs have been designed and used for promotional, product ties and educational purposes (IGDA Wiki, 2011). The latest international ARG was launched in 2012 by Google. Although not publicized, it is guessed that the purpose of this ARG is crowd sourcing (Mack, 2013). The ARG - called "Ingress", was created by Niantic labs (Dickey, 2013), - a team within Google. The narrative concerned a secretive government agency known as the NIA who set up a group of scientist to experiment with a strange energy called Exotic Matter or XM that can be found at "places of power". The players found themselves being privy to this information because of a person calling himself PAC who leaked secret information on his website. The players of this ARG, numbering in the tens of thousands, can participate in the game by decoding codes found on PAC's website, using an Augmented Reality application to find, tag and control "places of power" or just follow the story by visiting PAC's site daily (Google, 2012).

3.   Background of ARGs designed in the Multimedia Honours module

In the fourth year (Honours) Multimedia students have the opportunity to design an ARG. As the skill set needed for this design is so diverse, the students need to apply all the knowledge and technologies they have acquired from their first to their third year of multimedia study. The following section will discuss the narrative of the three ARGs that have been designed by these students as well as the technologies and skills needed for the design and play of these games.

3.1 Number 13 (2010)

In 2010 the fourth year Multimedia students made their first attempt at creating an ARG to run on the University of Pretoria campus. They were taught the basics of what an ARG is and provided with examples of previously professionally run ARGs. The students' first task was the creation of the narrative. The narrative they developed concerned a student whose sister was kidnapped on campus by an insidious splinter group of the Free Masons. The multimedia students, from here on called the puppet masters or PMs, did a lot of research related to the history of the Free Masons on

the University of Pretoria campus. This history was used as the basis of the narrative and the fiction, created by the PMs, was constructed on top of that.

The rabbit hole in this case was specifically designed to target pre-graduate students (referred to as players) studying the BIS Multimedia degree, and was in the form of a hack notification. The PMs distributed information to the players about the hacking of the university website and requested students not to access the hacked website, knowing that the curious students would do the exact opposite. The players who accessed the website to investigate the hack, were redirected, through the usage of JavaScript, to the main website designed for the game. There they found a timer counting down to a specific point in time, which the players had to figure out by calculating the amount of milliseconds left on the counter. They also found a video introducing them to the main character of the game; the student looking for his sister.

The players were required to go on a treasure hunt every week to solve various puzzles. They were redirected to these locations by an interactive map on the game website showing them a time and place they needed to meet. The treasure hunts consisted of finding various locations on campus based on obscure photos, searching locations for hidden clues, or by completing tasks put forth by the game characters.

Technologies used by the PMs to create the game ranged from basic web development tools, to authoring tools like Adobe Flash. The PMs used video editing and audio recording to create the videos released every week by the game characters. Physical technologies like outdoor projectors were also utilized during the run of the game as well as the use of devices to access the videos and the game website, the use of wikis to discuss game related events and to archive what happened during the week in the game. The players were required to employ basic cryptography to solve certain puzzles and unlock more narrative for the game. Mobile technologies were utilised by players to stay in contact with other players during live events.

In the end, players pushed the game to completion and reported back that it was a fun and successful experience. The PM's also considered the game to be a success due to the fact that players participated and drove the narrative forward.

3.2 Colossus Innovation (2011)

Based on the success of the 2010 ARG, the PMs in 2011 were very excited to create a more narrative focused ARG with more comprehensive narrative events. The narrative they created concerned a multi-national company called Colossus Innovation. This fictional company specialised in the research and implementation of what is considered pseudo-science; this included pet

resurrection, teleportation, nano technology and time travel. The PMs crafted believable characters with extensive digital footprints for the players to find which included weaving intricate stories surrounding the various game characters and their relationships with one another. Unlike the 2010 ARG, the PMs had to create all the content to make the company and characters appear legitimate including the use of Web 2.0 technologies such as Facebook accounts, Twitter accounts, etc. Character biographies were created and uploaded on the official website of the company as well as trails leading to each character's secret research within the company (top secret files, company correspondence, emails etc.) had to be created for the narrative to hold true.

The rabbit hole for the 2011 ARG was advertising campaign of the fictional company Colossus on the campus of the University of Pretoria. According to this advertising campaign the company was looking for recruits for exiting new projects. The PMs used posters, flyers and pamphlets on the University main campus to advertise their intentions. These advertising materials led the players to the company website where they could start digging into the details about the company and its employees (the narrative of the game). To drive the narrative forward, the PMs also released a viral video posted by a game character on the university main campus. This video portrayed a student jumping from one of the buildings on the university main campus and being teleported away. This video was distributed via various mediums. The players were required to find relevant information by searching through the game related websites and content which could be accessed by analyzing the content of the main company website. The players could for example find information by accessing the character biographies on the company website and through that, search websites like Twitter and Facebook for character profiles. The players were also required to participate in live events where they could interact with psychical material from the fictional company. Players also had the opportunity to participate in a live event hosted by the fictional company where they could find more information required to solve the games puzzles. These puzzles, unlike the 2010 ARG, resembled word puzzles and logic puzzles.

Similar to the 2010 ARG, technologies used by the PMs to develop the game ranged from the use of basic web technologies, to video editing and special effects. The PMs created fake physical documents to appear as top secret documents from the company as well as key cards and identity documents. The PMs also used their knowledge of digital media to create the profiles and background information for the game characters (personal pictures, biographical information etc.). The players were required to utilize Web 2.0 technologies such as Facebook, Twitter, Instant Messaging etc.

Unfortunately, the game was terminated prematurely due to the fact that players did not/ could not drive the narrative forward. The players did not succeed in finding the relevant information to solve the puzzles which in turn led to the narrative failing. It has to be noted that although the actual

game play failed the learning experience from the PMs side was not affected. The PMs still needed to employ a very specific skill set in the design of the ARG.

3.3 Campus Ghost (2012)

The third campus ARG was planned in 2012 as an event driven ARG where player participation was based on weekly events. After the failure of the previous ARG the PMs were of the opinion that player participation could be stimulated through such events. The narrative of Campus Ghost was based on a campus ghost story myth. According to this myth there are ghosts on the main campus of the University of Pretoria and students could interact with these ghosts. The narrative of the ARG was developed as an end of the world plot where a ghost on the university campus wanted the players to help him set other ghosts on campus free. The PMs were required to do research concerning such ghost stories being told on campus and specifically by residents in residencies. They used these established stories as the basis of the narrative and added their fictional storyline to this. Their main narrative was driven by a game character that used a website to collect ghost stories from university campuses across the world. Every week a couple of 'new' stories were released and the players could find the relevant information about the University of Pretoria campus ghost.

The rabbit hole of this ARG was a strange metallic icon built by the PMs that contained an electronic timer counting down to a specific event. This icon was placed on the University campus for more than a week and was moved a few feet every few days. On the day the timer struck zero, a payphone close by rang and a voice instructed the players to follow engraved instructions on the icon to a different location. The instructions were geographic in nature and could only be worked out from the final location of the timer. The new location provided the players with the relevant instructions they needed to complete participation in the game. The players were also provided with links to the Campus Ghost website mentioned earlier.

Every week the players received a video containing footage of them completing the previous week's tasks with special effects added displaying the ghost they were helping. The players, like in Number 13, participated in weekly treasure hunts but were also provided with digital puzzles during the week. The PMs encoded images on the website with snippets of narrative for the players to put together. From these small snippets the players could construct a fuller narrative experience that complimented the weekly treasure hunt.

The basic technologies used by the PMs were the same as the previous two years and included basic web development tools as well as electronic hardware created for the specific tasks. These included the electronic timer on the icon (used throughout the game to mark live event locations), a

radio transmission module built into an old television and the setup of the hardware for the live streaming. An additional technology requirement of the PMs was the advanced video editing needed for the creation of the special effects in the weekly released videos.

The technologies used by the players included a lot of digital encoding on images and hidden text in the website. Players had to look at the source code of the website and also had to play around with the distorted images they found on the website. The players had the opportunity to interact with the ghost through a live video stream hidden somewhere on the university campus. They communicated with the ghost by asking questions on an instant message add-on on the website. The ghost then answered them in real time via the live stream (text flickering on an old television set).

In the end the players and the PMs both experienced the ARG as a success and enjoyed both the interaction and the narrative experience.

From this background it is clear that a varied skill set is required for the design of an ARG. In the following section this skill set will be correlated to the skills and technologies taught in the three year Multimedia degree. This skill set does not contain all the skills taught in the Multimedia degree only those that pertain to the design of the ARG.

First year:
- basic HTML and HTML 5;
- basic image editing and creation skills (Photoshop, GIMP);
- basic design skills;
- basic programming skills (Java, C#, C++);
- introduction to animation (Adobe Flash);
- introduction to sound editing (Adobe Audition).

Second year:
- advanced web development skills (JavaScript, jQuery, ,PHP etc.);
- usage of web based technologies (Web 2.0 technologies);
- advanced programming (C++, Java, C#);
- relational database development (SQL);
- theoretical basis of multimedia basics (hypermedia, information architecture and trends);
- video editing and creation (Adobe Premier).

Third year:

- Computer Science skills vary depending on the students individual subject choice and varies from computer security, artificial intelligence, computer graphics, programming language, etc.
- a theoretical base of multimedia trends (Social media and education, etc.)
- advanced video editing (Adobe Premier, Adobe After Effects);
- Human Computer Interaction (Gesture based interaction, Multiuser interfaces, etc.);
- Game design theory.

4. Advantages and challenges in utilising an ARG for teaching purposes.

Before attention can be given to the advantages and challenges of utilising an ARG for teaching purposes, it is necessary to distinguish between games and gamification. Although gamification is presently a very important trend it is currently being driven by novelty and hype (Gartner Research, 2012). It is significant to note that not all games utilized within an education setting is gamification. Gamification is the use of game thinking and game elements in a non-game context in order to engage users and solve problems (Gamification wiki, n.d.; Zichermann & Cunningham, 2011). The aim is thus to enhance the process and experience of doing daily activities. Gamification enhances the experience of using an existing system by borrowing elements from games. In contrast to gamification, games are built from the ground up. The goals and actions the players take and the rules surrounding the system are all created from scratch.

The following table lists the differences between an actual game and gamification (Gamification wiki, n.d.):

Game	Gamification
Games have defined rules & objectives	May just be a collection of tasks with points or some form of reward
There is a possibility of losing	Losing may or may not be possible because the point is to motivate people to take some action and do something.
Sometimes just playing the game is intrinsically rewarding	Being intrinsically rewarding is optional.
Games are usually hard and expensive to build	Gamification is usually easier and cheaper
Content is usually morphed to fit the story and scenes of the game	Usually game like features are added without making too many changes to your content

Table 1: Differences between games and gamification

As discussed earlier in the paper, an ARG is a game and not a gamified system. An ARG offers various advantages to the designers and the players in the learning environment. Firstly, designing an ARG provides an opportunity to employ previously learnt skills in a real world application. An ARG designer provides the players with an immersive experience that arguably better simulates the reality of information distribution (Dondlinger, 2009). This experience is interactive which promotes an active learning environment (Sokoloff & Thornton, 1997). An ARG compels designers and players to find information from a variety of places, evaluate the relevance of the information, and apply the information to solving the current problem. These skills are instrumental in a knowledge-based and information-saturated workplace (Dondlinger, 2009). However, there are challenges involved regarding the use of such an approach. From the years of experience designing and running the previously mentioned three ARGs, the following challenges presented themselves:

- the time allocated for the fourth year module, namely 14 weeks, is very limited to design and implement an comprehensive ARG;
- the ability of the group to effectively work together for prolonged periods of time;
- the successful play of an ARG cannot be guaranteed;
- the limited funds available to the students to create the ARG and the
- technology available to the targeted players cannot be assumed (augmented reality, access to broadband).

Taking these advantages into consideration it is envisaged that the following ARG, designed by the Multimedia fourth year students, will enable first year students to strengthen and enhance their library literacy skills.

5. Possible future application of ARG in Library Literacy training

Within an African context, many students do not have access to a library, and those libraries that do exist are almost always poorly resourced. It is essential for education institutions to equip people with the skills and means to become information-literate and to enable them to locate, access and evaluate information (Mchombu & Cadbury, 2006). The University of Pretoria addresses this problem through a compulsory Information literacy module in Academic and Information Management. It is envisaged that the following ARG will supplement the skills taught to the students in this module through their participation in the game. According to Dondlinger (2009) an ARG can simulate information distribution and the skills necessary to seek, locate and evaluate information in a highly meaningful way. These library literacy skills will be included in the obstacles and puzzles of the ARG and will enable the players of the game to solve the various puzzles. Skills such as locating various information sources, accessing these sources for relevant information and

evaluating the information can be built into the narrative and puzzle design of the ARG in such a way that the students will strengthen these skills without focussing on the educational goal thereof. Applied in this fashion, the fourth year Multimedia students can use the skills obtained throughout their three year degree to design an ARG and the first year students can strengthen their library literacy skills obtained in their Academic and Information Management module.

6. Conclusion

This paper has demonstrated that the design of an ARG can be used as a capstone for a multimedia degree. As the skills and the technologies acquired by multimedia graduates are so diverse and constantly changing, it is very difficult to find a project that encapsulates all these skills. The design of an ARG effectively utilizes these skills in a real world application providing the students with skills that are instrumental in a knowledge-based and information-saturated workplace (Dondlinger, 2009). As games in education aim to engage students, providing them with digitally enhanced scenarios that challenge their understanding of new concepts in their field (Johnson, Adams, & Cummins, 2012) it is envisaged that the 2013 ARG will enable first year students to strengthen and enhance their library literacy skills. These skills are necessary for success in the 21st century (Van de Vord, 2010).

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