Building Social Commmunities around Alternate Reality Games

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Abstract- *In recent years, alternate reality games have entered the mainstream as a new form of entertainment. The Living Stories project is the first alternate reality game in the UK, which addresses environmental issues. Living Stories combines social networking sites such as Facebook and Twitter with Second Life, to create a platform, which allows social networking to feed into content creation within a virtual world, and facilitate and encourage real-world behaviour through virtual rewards. The project is funded by Interactive Digital Media IDM, as part of an ongoing collaboration with the Eden Project, Coventry University Serious Games Institute and PlayGen Ltd. The aim of this project is twofold: firstly to engage new visitors and to extend the Eden experience beyond the actual visits, and secondly to increase user participation amongst groups that do not traditionally visit Eden Project. In this paper we describe the unique technical and pedagogic challenges addressed when creating this platform and consider how the state-of-the-art in alternate reality gaming can be applied in an educational ('serious') context.*

Keywords- Mixed Reality, Alternate Reality, serious games,

I. INTRODUCTION

Mixed reality (MR) refers to the merging of real and virtual worlds to produce new environments and visualizations where physical and digital objects co-exist and interact in real time.

Paul Milgram and Fumio Kishino [1] defined a mixed reality as "...anywhere between the extrema of the virtuality continuum.", where the Virtuality Continuum (VC) extends from the completely real through to the completely virtual environment .

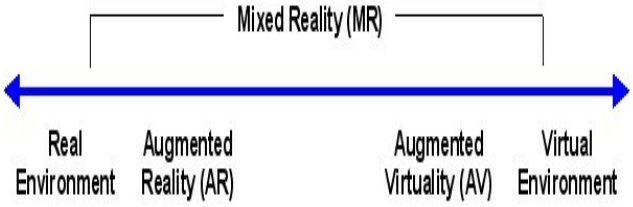

Figure 1: Virtuality Continuum [1]

Alternate Reality Games (ARGs) are a subset of mixed reality. ARGs are an emerging form of gaming which blend real-world content and activities with virtual or synthetic storylines. Their widespread usage has been promoted by the rapid uptake of smart phones, capable of running web applications remotely, and providing features such as global positioning which can be readily integrated into games. Although the range of themes and gameplay models in ARGs are diverse, common themes include interactions with virtual characters, plot-based challenges and puzzles, and collaboration and competition between players. ARGs frequently use multimedia elements (i.e. videos, photos, sound), or telephones, email and mail but rely on the Internet as the central binding medium. Technologies such as RFID tags, motion sensors, the aforementioned GPS, high definition camera, touch screens and lightweight game engines can be used in order to realize the game [2]. Interestingly, these technologies may effectively take the game out of the console or computer terminal into (interactive) space(s), encompassing both the private and public domain [3]. Hence, such technologies allow for the realization of ARGs that include existing urban/corporate spaces into game environments [4].

Games devised around an augmented reality approach often use spatial, temporal and social expansion in order to create the illusion of reality – a universe of discourse in which the rules of the game apply [5]. Spatial expansion indicates that the socially constructed location of the game is unclear or unlimited. Games such as *Songs of North* [6] or *I Love Bees* [7] have used a cityscape as playground, expanding locally and even globally. From the player's perspective, one captivating factor is the uncertainty of which locations are actually gaming areas. A Socially constructed game session, by comparison, is interlaced and mixed with ordinary life. In *Killer* [8] every action the player does until the game is over might be a game action. Temporal expansion can be done in many ways: Some games (*Majestic*) might stay dormant for long periods of time, but alert the player into playing them at any given moment, whereas *Publius Enigma* left the players in the dark on whether the game ended at all [9]. In other examples, the exact starting point of *Prosopopeia* was left quite undefined by the

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game, since non-game events were retroactively redefined as parts of the game. Social expansion offers opportunities to stimulate community formation by encouraging spontaneous interactions amongst people with no existing social ties, and allowing them to play a role as either spectators or participants. Marketing opportunities are also significant, both when marketing pervasive games themselves (*Perplex City5*) and when marketing some external product (e.g. *the A.I. Game*).

The first ARG to essentially market itself (apart from the failed *Majestic*) was *Perplex City* with its associated collectable puzzle cards.

Recent examples of large-scale ARGs include the educational games *World Without Oil* [10] and *Superstruct* [11], and the promotional game *I Love Bees. The Tower of Babel*, an ARG designed by the European ARGuing Project, was used in schools as well as by learners of all ages. It was developed to engage students in learning languages other than their own [3].

II. ARG PROJECTS

The term Alternate Reality Game implies that players enter into an alternate reality. The main aim of ARGs is to create a storyline that infiltrates real life, grounding itself in the everyday environment but adding game or narrative elements to create engaging material from otherwise mundane events and places.

To do this, storymasters (i.e. game designers) typically create clues or story elements and spread them throughout the players' environment. Those clues and problems allow players to advance – and in some cases manipulate – the unfolding story. The game environment, and hence players' information space, thus frequently includes regularly visited Web sites, Internet Messaging, e–mail, physical locations and news sources. One metaphor put forth by ARG designers is the formation of the story as creating an archaeological dig for players to explore; instead of creating shards of pottery, bone and fabric, game designers hide pieces of content that players need to assemble into a coherent story and solve the problems the story presents [12].

Historically, much ARG investment and development of has been undertaken to provide 'added value' or generate excitement about forthcoming products through the stimulation of web communities via ARG participation. A typical example of such a game is the *BEAST*. The game was created to promote Kubrick/Spielberg's movie *A.I.* The game was set in the future, and clues were strewn throughout posters, trailer credits and mass mailings.

In ARGs, players can have the flexibility and control – either exclusively or as part of a larger collaborative effort - over how quickly puzzles are solved, story direction, and the characterization of various aspects of the game. For that reason, these gamers are not only participants but they are also narrators. Players' responses often change the game designers' story, pacing or set of problems. For instance, in one game (i.e. the *BEAST*), the game designers created what they believed were three months worth of very difficult puzzles. However, when placed in front of an Internet audience, these puzzles were solved within a day, and thus the game designers had to rethink their entire strategy, ultimately choosing to release new information on a weekly schedule. That way, they could create content and deliver it without trying to keep up with the collective force they had created. The players changed the entire story delivery and timing mechanism of the game, just by being eagerly involved, demonstrating the collaborative culture that ARGs seem able to foster. This has influenced game designers to focus on problems that no single individual could solve, and hence players must develop a strong community for the experience to be complete. Additionally, since technology enables distributed players to work together, the power of a collaborative work effort from an enthusiastic web audience has been demonstrated. During an ARG, collective action could span over different continents. Problems are solved by teams working in different time zones, languages and specialties. Web–enabled and real–time access to the clues, puzzles and available solutions is a necessary prerequisite for a collectively solved ARG. However, the role of the players and their contributions in the game is not well analysed. The heterogeneity of views across participants, characters and game designers needs to be understood, as they are critical in achieving the collective goals [13].

Table 1: Timeline of ARGs

A. **Name**	*B.* **Gameplay**
The Beast (2001)	Puzzle solving by online communities. Rewards in the form of new websites and videos.
Majestic (2001)	Featuring phone calls, emails and other media that involved players in a multiplatform narrative, the game was eventually cancelled due to lack of players.
I Love Bees(2004)	Puzzle solving by online communities. Information released by phone calls to public telephones. Rewards in the form of new websites and videos.
Last Call Poker (2005)	Puzzle solving by online communities. Real world missions in cemeteries. Online poker with dead characters. Rewards in the form of new

	stories and videos.
Perplex City (2005-2007)	Puzzles solving by online communities. Collecting and solving of puzzle cards. Real world clues and events. First succesful ARG run as a commerical enterprise in its own right. Rewards in form of badges for puzzle card solutions, and a final £100,000 prize for locating the Receda cube.
Waking City (2006)	Puzzle solving by teams in real space and online. Narrative driven by character actors, telephone systems + web sites.
Year Zero (2007)	Players solve puzzles, listen to recordings, and watch movie clips, to gain more info and find sites.
CommanderVideo (2008)	New; Ten recruits are the major players thus far.
The Lost Ring (2008)	Puzzle solving by online communities. Real world missions. A new olympic sport "The Lost Sport" was introduced.
The XenoVaradox Saga (2008)	Puzzle solving, currently done by donation-funded online communities. Email correspondence, parcel drops, and various meatspace interactions are the areas of play.
ARGuing (2008)	ARGing tries to bridge the technological gap between educators and their students and tries to motivate students to understand the benefits of learning languages at a level that impacts on their existing personal and social lives. At the moment the project is recruiting secondary schools from Europe to play the final pilot .
Gbanga Zooh (2009)	A billboard catches passers-by's attention to wild animals that live across the city (Zurich, Switzerland) and that need to be saved. Their natural habitat is endangered, and participants are asked to bring the virtual animals to the real zoological garden Zooh.
PIE Network (2009)	Players solve puzzles, listen to recordings, and watch movie clips, to gain more info and find evidence to prove a theory. Players submit videos, photos and stories as evidence.
XenoVaradox (2009)	Rewards in the form of new websites, videos, and other interactive opportunities.
Xi (2009)	Users must solve puzzles, watch video clips, and do objectives in and out of Home to gain more information to help find Jess and the meaning of Xi. Users must search in Home as well as in the real world depending on the puzzle or objective.
Gbanga Famiglia (2010)	Join or start your own Mafia Family and take-over virtual establishments you discover whilst walking around the city. Establishments are linked to real-world establishments, so players must physically move between locations. A successful take-over depends on the Family's power, determined by the number of Family members and the cash total for special items collected.

III. DESIGNING INTERFACES FOR BUILDING SOCIAL COMMUNITIES

With the advent of Web 2.0, the second wave of websites and applications offers a much richer experiences via social networking. Social networking, a highly flexible platform, allows users to interact, communicate and collaborate synchronously and/or asynchronously with or without revealing their identities as an individual or a member of a group on the go [14]. Not only that this platform is user-friendly, some social network services, such as Facebook, are also friendly to application developers. For instance, the "plug-in style" platform [15] allows third parties to develop their own social-networking applications that enhance the platform functionality or act as front-end mediums to a third party web-based service [16]. Owing to its openness, social networks, such as Facebook, now attracts "more than one million developers and entrepreneurs around the

world" and has "more than 550,000 active applications" on its platform [17].

The Internet has fostered such environments to support social interaction at an unprecedented scale. Thousands of people come together in online public spaces to exchange ideas, ask questions and comment on daily life events.
People are using the Internet in order to search for jobs, communicate with friends and family and exchange ideas. These social interactions can leave behind a trace of some sort such as: exchanged email messages, IM logs, newsgroup postings and blog entries. Hidden in these growing archives of interactions are useful social patterns that, if more easily perceived, could greatly improve the social dynamics of the online world [18] .

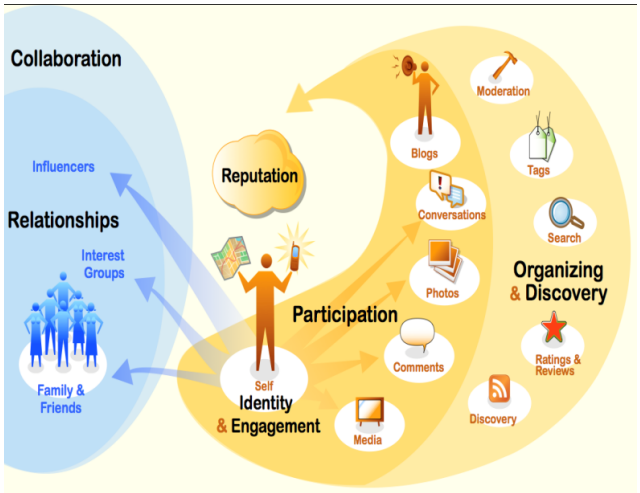

Figure 2: Social Media Ecosystem [18]

The concept of social interfaces is not new [19]; in the case of this original definition, it describes the interface between two communities with identifiable differences in social norms. Relating this to a web context, the end-user is almost ubiquitously interacting with their computer alone, and therefore the end-goal as a designer is to create a 'frictionless' social interface that enables individuals to merge into large communities with no *a priori* knowledge or experience. The site hence eases their transition from an individual social context into the role of a community member. Social interfaces are hence designed and deployed to support ongoing, geographically dispersed gatherings of people drawn together by common interests and the conversational power of textual exchange [14].
Moreover, designers need to be savvy of the social norms of the Internet, and specifically, how Internet users tend to be drawn into, or distance themselves from, certain communities and groups. Such understanding needs to be coupled with a technological understanding of how information may be presented and managed to stimulate debate and discussion. A central concept here is that of 'critical mass'. For example a site perceived to be deserted, as a lack of frequent messages and updates is unlikely to attract users to contribute. The designers of a social interface thus need to focus on ways of attracting users into their application. The system should allow the user to engage with a service, build his identity, assert himself so others can connect and interact with him, and develop a rich reputation that is built out of his activity within the application [20].
When designing social interfaces, the designer needs to identify what social objects (i.e. text, pictures, videos, etc) belong in the architecture and how are they going to be supported by the application. By identifying the social objects then the designer has to identify the different activities (i.e. Collecting, Sharing, Broadcasting and Publishing, Feedback, Communication, Collaboration, and Social Search) that allow people to engage with others around this social objects.
In order to evaluate the effectiveness of the ARG we need to focus on two areas:

- Evaluation of the Game Elements
- Evaluation of the social aspects of the games

The work done by Crumlish [20] may provide useful information by providing metrics in order to evaluate the social elements of the games.

IV. Case Study: The ISEED Game

The Living Stories Project (iSeed) is a social, online, location based, alternate reality game, utilising user generated content including photos and stories brought together through mash-ups, using Facebook, Twitter, Google Maps and Second Life. iSeed was developed by PlayGen Ltd, a company that develops serious games and simulations, in collaboration with the Serious Games Institute and Eden project. This game aims to combine the real word with the online community by using social sites (i.e. Facebook and Twitter) and the Virtual worlds by using Second Life.
The concept behind the game is to generate an interactive community wherein players share information and learn from each other, in accordance with social learning principles. By sharing this information we aim to highlight the areas of work of the Eden Project, allowing new revenue to be created.

The overarching aim of the living stories project is introducing targeted groups of participation with the Eden Project -with a focus upon 18-35 year olds- who are currently hard-to-reach through the present programmes and activities at the Eden Project. The project also has a potential to reach international audiences with the stream of activities at Eden including the Live Sessions.

Figure 3: Living stories: iSeed Game

Players take photos of plants, produce or even places of natural interest and upload them to the site via their phone or online adding an associated personal story. These then become a 'Seed', which other players cultivate by commenting, rating and tagging. 'Seeds' thrive or flounder based upon the interest they generate and the quantity, and peer-assessed quality, of comments people make. Seeds can be a variety of different things from a plant or flower to a place of interest or even a business like an organic farm. But they must all be linked to a cause relevant to the Eden Project. Players will only be able to plant up to 5 seeds a day, reducing the potential for unwanted 'spam', and encouraging players to only publish their most interesting stories, photos and videos.
Seeds thrive on how much interest they generate. Popular Seeds will appear at the top of rankings as other players' rate them. Players can either give a story a simple 'thumbs up' or 'thumbs down'. The rankings are sorted using many criteria, such as Causes, Tags or players. Using this model, the best stories are intended to spread, promoting their associated causes.

All Seeds must be relevant to a Cause/ Challenge, and the player will be asked to assign each Seed to one or more Challenges. From this Cause specific pages can be created, using associated stories and media to promote each Cause. A example of a Cause could be 'Clean Energy', 'Food and Farming' or 'Deforestation'. The Eden Project will be able to add 'Causes' to the games inventory. These will be related to or supported by the Eden Project.

Figure 4: Challenge Section

The objective of the game is to grow as many successful seeds as possible and interact with other players. There is no end point to the game. Success is determined via a constantly evolving ranking system.

Figure 5 : Ranking System

The 10 most popular seeds according to the ranking system will be displayed as a tree in Virtual Eden (see Figure 6).

Figure 6: Eden Project in Second Life

V. Evaluation of ISEED

The purpose of this evaluation was to assess to what extent iSeed had raised awareness of environmental issues and increased the participation of our target group (i.e. 18-35) with the Eden Project. The evaluation was based on two sources of data: a) the demographic information left on the site, b) the feedback left on the site by the players.

iSeed raised two main challenges in terms of the evaluation. The first challenge was the evaluation of the Game Elements (i.e. usability issues in terms of the GUI and storytelling) and the second challenge was the social community evaluation (i.e. usage uptake by the member of the targeted communities).

The evaluation was focused on the social implementation of the game. The data were collected from Facebook and were stored in a custom made database.

During this preliminary study, we collected data from 41 players that were actively involved with the game. The players were of all ages, see Figure 7, but the majority was formed by players aged between 21 and 30 years-old (41%) followed by players aged between 31 and 45 years-old (20%).

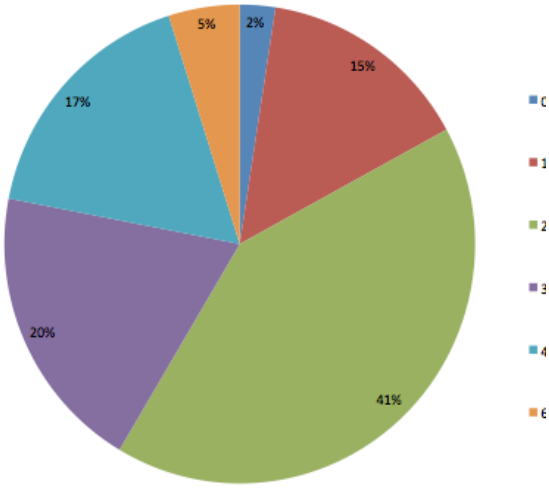

Figure 8: Age Range of Participants

This population was geographically located across the UK territory as follows: East Anglia (12%), East Midlands (10%), West Midlands (27%), North East (2%), North West (5%), South West (5%), South East (7%), Scotland (2%) and London (15%).

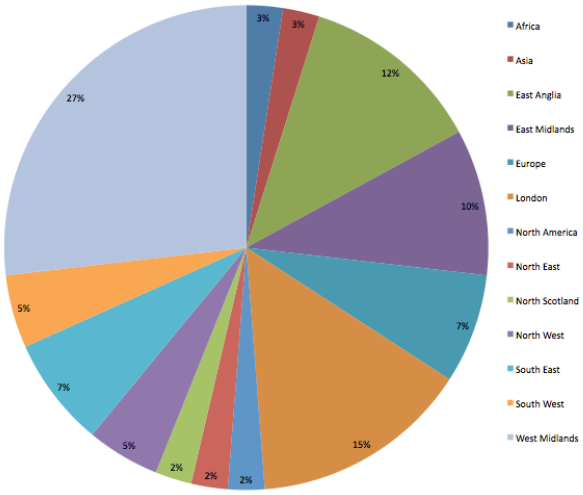

Figure 9: Breakdown of Participants in different geographical areas

A major factor of the game was to increase the environmental awareness of the players. In order to test the environmental awareness of the players, we have asked them to provide us with information relating to the environmental agencies that they are aware of (see Figure 9).

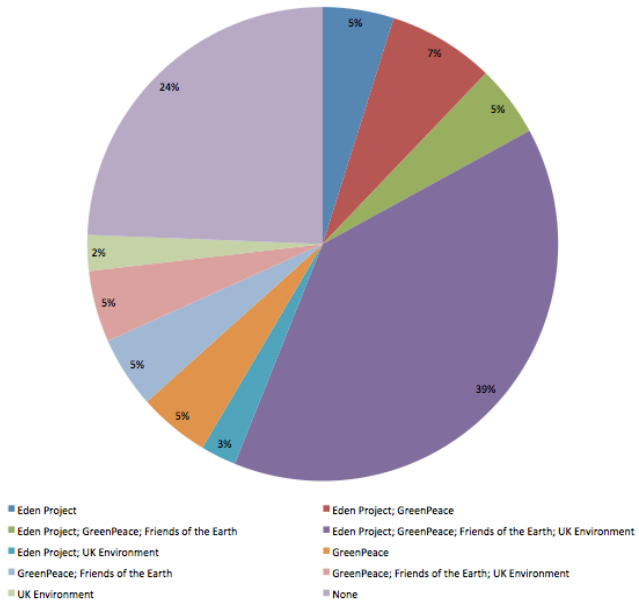

Figure 10: Environmental Agencies Awareness of Participants

Overall, and noting the limitations of the relatively small sample, our results do suggest an interest from individuals (24% of the sample) with no prior awareness of the cause. Similarly, the majority target audience of 21-30 (41%) supports the notion that a serious, alternate reality game appeals directly to this age range. Future work, based on data collected as the game runs over time, will offer a more comprehensive sample with which to further confirm these hypotheses.

For a social interface to be successful the developers need to cover patterns concering self-representation, which can be loosely grouped under the themes of Identity, Presence, Engagement, and Reputation. The identity of the user in particular is an important consideration; in our context we targeted a demographic broadly hard-to-reach tthrough other environmental initiatives. The sense of presence and engagement can be fostered to an extent by the look and feel of the technological platform, but must also consider that technology alone is not a viable substitute for engaging narrative and activity. Finally, as social learning relies on the extent of an individual's sense of reputation and role within a social group, this must also be thoroughly considered when designing a game, which may not present a theme that individual participants have an existing affinity for patterns of social objects (Collecting, Sharing, Broadcasting and Publishing, Feedback, Communication, Collaboration, and Social Search), and patterns of the social graph and location (Personal Connections, Community Management and Place, Geography, Location).

VI. Conclusions and Future Work

One of the key challenges faced by the Living Stories project was to encourage a hard-to-reach demographic to not only participate in online discussion, but to also extend their participation into the real-world. Particularly with respect to environmental concerns, this is a major and long-standing challenge, which harks back to Hardin's *Tragedy of the Commons* [21]. Our work has demonstrated the depth of this challenge and presented ARGs as one potential solution. However, much work remains to analyze the best mechanisms by which to stimulate community formation and action through the use of an ARG in this context.

The combination of social interactions with gaming is not a new phenomenon. Typical examples of such merging are the online multiplayer games which have a social aspect (i.e. forming guilds, chatting among users, points and leader boards). The use of game mechanics in social application may increase user participation on the social game. Thus developing games within an existing social environment should build upon the tools and experiences that already exist in the host environment. However further research needs to be done in order to understand the social elements that need to be included into alternate reality games in order to make this game successful.

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