Bridging Media with the Help of Players

Michael Nitsche, Matthew Drake, and Janet Murray

School of Literature, Communication & Culture, Georgia Institute of Technology
686 Cherry Str., Atlanta, GA 30332-0165, USA
{michael.nitsche,mdrake,janet.murray}@lcc.gatech.edu

Abstract. We suggest harvesting the power of multiplayer design to bridge content across different media platforms and develop player-driven cross-media experiences. This paper first argues to partially replace complex AI systems with multiplayer design strategies to provide the necessary level of flexibility in the content generation for cross-media applications. The second part describes one example project – the Next Generation Play (NGP) project – that illustrates one practical approach of such a player-driven cross-media content generation. NGP allows players to collect virtual items while watching a TV show. These items are re-used in a multiplayer casual game that automatically generates new game worlds based on the various collections of active players joining a game session. While the TV experience is designed for the single big screen, the game executes on multiple mobile phones. Design and technical implementation of the prototype are explained in more detail to clarify how players carry elements of television narratives into a non-linear handheld gaming experience. The system describes a practical way to create casual game adaptations based on players' personal preferences in a multi-user environment.

Keywords: cross-media, television, gaming, narrative, player-centric.

1 Introduction

In order to navigate the complexities of content transformation from one delivery platform to the other in cross-media environments, this paper will suggest focusing on the player not only as the interactor but also as participant in the generation of new experiences. The first half this paper will outline the problem set and the development of such a player-driven approach with its challenges and advantages. The second half will exemplify this approach using a cross-media application we developed based on this kind of player-centric approach.

To note that we are in the midst of the battle for the living room is an outdated understatement. With ubiquitous computing settling in through new generations of smartphones every possible media format, its delivery, and place for media consumption is changing. So are the design and publishing paradigms: the iPhone is challenging the Nintendo DS as the dominant handheld gaming platform, a provider like Verizon expands its own game delivery channel, and Sony first combines movie experiences between its PS3 home console and its PSP handheld only to present the next PSP iteration as completely relying on digital distribution. Networks like Xbox Live

I.A. Iurgel, N. Zagalo, and P. Petta (Eds.): ICIDS 2009, LNCS 5915, pp. 269–279, 2009.

and the Playstation Network deliver games, movies, streaming video, and other media services across various devices adding more dynamics to a shifting landscape. The problem we will address here is in this area of media convergence. Blurring borderlines leads to a 'content continuum' wherein 'all platforms […] will deliver slices of the content pie' (Steve Billinger cf [1]). Yet, how elements of traditional media narratives can make this transition remains debated.

1.1 Multiplayer Content

Remarkable research efforts investigate computational systems designed to deal with the complexity of new narratives (e.g. [2] [3]). But the continuous changes in merging content formats between constantly improving technical platforms poses challenges beyond that of AI storymaking systems. Blending services over different platforms results in a level of complexity that is reminiscent of emergent play forms found in Massively Multiplayer Online Games. Here, players' ingenuity has led to countless unexpected dramatic and narrative creations that often defy the designers' intentions. As Morningstar and Farmer, pioneers of the graphic multiplayer world Habitat, discovered already in the first generation of graphic multiplayer worlds: '*detailed central planning is impossible*' [4]. Players who engage with these worlds often adapt to new media and narrative possibilities with impressive speed and develop a mastery that allows them to tweak and re-use the available features in countless new ways. The level of media literacy among this generation of players can developed fast, not only in MMOGs but also in other inherently multiplayer game forms such as Alternate Reality Games (ARG). These players are at ease with constantly shifting literacy forms [5], which themselves have been suggested as important discourse forms [6] and opportunities for social formation [7]. For these players, the complexity of a media situation is not a hindrance but the very canvas they use to express and realize their engagement. One example for the resulting new formats is the culture of Machinima [8]. However, these systems often distinguish between producers and consumers – machinima makers and audiences of the finished product; puppet masters and players of an ARG. What if instead *every* situation rooted in existing media would be customized and affected by *every* player as it is adapted into a new interactive form?

Multiplayer game design is a treasure chest for cross-media design as it deals with the provision of a creative pool from which players can define new content. Emergent play forms can be utilized as the 'possible worlds' [9] become access points to bridge the gap between different media. Multiplayer design allows us to stage players as active factors in the transformation of traditional storylines to nonlinear gaming conditions and their highly adaptable emergent play forms lead to player-centric approaches that are not only flexible enough in concept but, as this paper will demonstrate, are a technically feasible approach to navigate the complexities of the task at hand: to connect traditional media and narratives to new forms of gaming experiences across different delivery platforms.

1.2 Tapping into the Player

Multiplayer content shares some qualities and challenges with collaborative storymaking. Collaboration between players has been noticed as a productive tool whether

is it in educational games [10], for the development of novel interfaces [11], or creative use of existing ones [12], among other applications. The question often mirrored in this literature is how to engage players in a collaborative creative process without presenting cumbersome interfaces along the way.

It cannot be expected that every player would succumb to the hard work of handcrafting new content. The learning curve for advanced Machinima production, for example, includes often mastery of the game engine, multiple graphic programs, editing suites, 3D modeling, sound production, and most of the pre- and post-production pipeline of a film shoot [13]. Machinima might be a useful reference, as it is a comparably cross-media format, taking content from gaming to video. It also highlights the challenges at hand: simplifying the involvement of the player. In the example case below, the reverse transition is attempted. NGP adapts content from existing traditional narratives (TV shows) into handheld gaming. The question of how to involve players' collaborative efforts in the generation remains central and the project has to offer a solution for the complexities and accessibility of the media transformation by the user.

The following discussion aims to answer these questions using the Next Generation Play project conducted at Georgia Tech's Digital World & Image Group (http://dwig.lcc.gatech.edu/) as example, discussing its design parameters, implementation, and functionality.

2 The Next Generation Play Project

The focus of the Next Generation Play (NGP) project is on media convergence between television and handheld casual video games. It addresses cross-media design by connecting an interactive 'big screen' TV experience with a casual 'small screen' game played on mobile phones. In that way, NGP is based on traditional media, namely existing TV programs, from which it derives content elements for nonlinear gaming. These programs can be narrative, dramatic, poetic – in fact, the individual show's format does not matter as each program is treated as a source for virtual objects that traverse from the TV to the gaming experience.

The overall experience consists of three main elements. First, players engage with an interactive TV application that consists of a collection game wherein players can gather media objects as they become available on screen during a TV show (for a more detailed background see [22]). Second, they engage with a handheld casual game, which is based on their play events and the objects collected from the TV game. Third, they can exchange items in a form of virtual trade.

2.1 Overview

Users playing the NGP prototype are invited to collect virtual objects embedded in the film clip of the TV show they are watching. Because the choice of the TV program and the decision which item to collect both reflect the player's personal taste and preferences, this collection of objects leads to a highly individual inventory. The personal inventory of each user is stored in a central database. From there, NGP expands into a casual multiplayer game on handheld devices. When activated on the mobile phone the game connects multiple players to start an instant multiplayer game session. Together they play a casual 2D platform jump 'n' run title not unlike established

console games of that genre. The game levels are procedurally generated on the server side and populated with the items from each participant's inventory of collected TV objects. Thus, the objects of interest during the TV session turn into interactive pick ups, enemy characters, or they might become part of the scenery in the game session. The uniquely created game instance allows players to share their personal inventories in a playful way with other participating players. Finally, players can exchange items after the game is finished. This is done in a virtual trade set up, which allows them to bid for and swap individual objects they have encountered in the game session.

NGP did not set out to replace existent media but to build on established media formats and story content to spawn new interactive experiences. NGP does not so much generate new storylines but it evolves from existing storylines and storyworlds of traditional TV media. Characters, story items, scenery, any depicted element of the TV show can be re-used as interactive element in the gaming experience. NGP uses the concept of player collections and profiling to generate a personalized database of interesting objects for each player. This database opens up the necessary possibility space from which surprising interactive situations are generated. It is up to the players to provide the active ingredients for this experience and the differences in their individual tastes and preferences are the basis for the emergent game situations. It is up to the game generator to combine them into a unique game setting. These features co-define the possible multiplayer-centered content transformations suggested here but it had to resolve a number of design and technical challenges to operate.

2.2 Design Philosophy

To avoid any learning curve during the game creation the project provides impromptu play or *ad hoc* "renegade play" [14]. That means, the game has to be immediately accessible. It has to be simple enough to be picked up at any moment but also engaging and fresh each time it is played. Instead of careful preparation and optimization, these games provide instant access to playful interaction. These forms are often supported by casual games that allow for fast, short, and accessible play.

Player behavior and demography of casual gamers differ significantly from so-called hardcore players [15]. Thus, in order to support this kind of *ad hoc* gaming, the game design had to be accessible but also variable enough to attract continuous revisits to the game setting, as they are common in the casual player world. That is why, although our underlying architecture is genre-agnostic, we chose a 2D platform jump'n run game as a typical example for accessible multiplayer gameplay. It allowed us to present players relatively short but variable levels to utilize the system. It also provided us a challenge to test the latency and network capabilities of the available hardware (this is a part of the project that will not be covered here).

Because the goal was to provide player-centric content transformation, this level of flexibility in the usage of the media objects had to be connected to the social settings of the cross-media experience. Video games offer a range of different social settings, each one with its own parameters. Whether it is a single player, Local Area Network event [16], or the online communities of MMOs [17] [18], each setting fosters certain forms of (social) interaction. NGP set out to connect TV experiences with handheld gaming in a multiplayer setting. This implies the transition from a traditionally single user experience in front of the screen to a multiplayer experience on the mobile

device. This is not only a shift in terms of technology but also in terms of social game design. As outlined above, NGP utilizes the unpredictability of games as social media to create new interactive experiences. It is the combination of random players that defines which inventories are used to generate a game world. As one can never predict the countless variations of collected objects, preferences of the nearby players, and random elements in the game world generator, the system combines basic AI in the world generation with much more complex levels of player variety.

2.3 Players Connecting to Existing Storyworlds

Co-presence has long been noted as an important design factor in digital media [19]. However, co-presence of other players does not necessarily always lead to higher involvement or increased social interaction during game play [20]. NGP had to make sure that the game's design and technical implementation assists this transition.

Because the virtual items can always be traced back to one player's TV preferences, NGP actively taps into practices of TV fandom. Through the connection between TV and handheld game, NGP connects game generation with interactive TV viewing and players shape the game world through their personal choices of TV programs (their taste) and collected objects within them (their preferences). One player's personal obsession to "get" all items from a certain TV show will directly affect the game worlds of everybody else who will ever play with this player. On the other hand, if inventories of players show a lot of overlap in collected items, the range of available different game objects will be limited. Each virtual item can be coded to behave in an appropriate way that supports the original storyworld. The appearance and animation of each item is always pre-set. This continuity ensures that the reference to the underlying narrative remains intact. More importantly, the player can still recognize the item and its context from the TV original. The storyworld of the TV show and the player's connection to it become directly responsible for the player-dependent game generation. On a design level, this supports the necessary level of co-influence in the content transformation.

At the same time, some underlying rules are needed to spawn the game levels. A procedural level generator assembles the collected objects of all players involved in a game session whenever they create a game instance. The result is a unique playable 2D "play" that is sent to the participating mobile phones. While the main interaction remains relatively simple the underlying game levels change from instance to instance and therefore provide engaging surprises.

Because game levels are based on each individual's TV preferences the gaming situations are a form of interactive debate *about* each favorite's show. A fan of the *Superman* animated series might meet a dedicated *Lost* fan – and both TV shows will populate the 2D game, providing surprising interactive options and ample opportunity to discuss the differences of the game as well as the TV content afterwards.

To further support the interaction between players and their collaborative engagement after the game event, we included a "share" function in the system. If a player has encountered an interesting item provided by another player in a game session, then the first player can offer a virtual object trade to the second. If the offer is accepted, two virtual items will be swapped and the inventories are re-arranged. In that way, players can continue to build their virtual inventory.

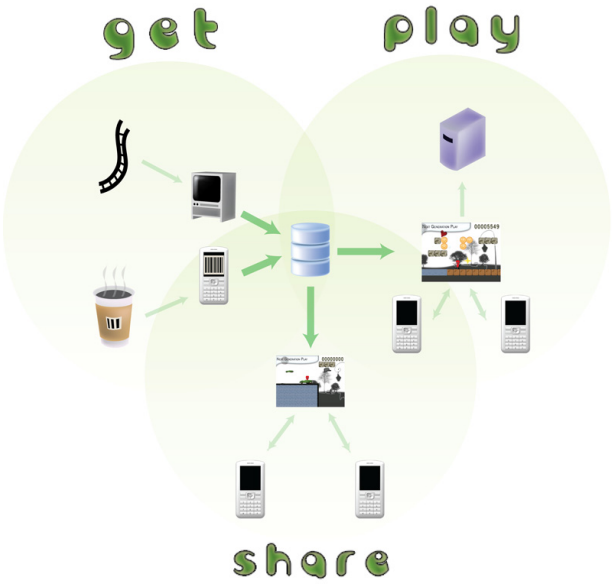

Fig. 1. NGP basic architecture

3 Implementation

At the core of the system is a database that administers the object collection and user ID management. This database track the three stages of "get", "play", and "share" throughout. It also synchronizes TV game and mobile game. The 2D game itself uses a separate server for the level generation and updating of the handsets active in the game session.

3.1 TV Game

The TV Collection game began as a project in Janet Murray's eTV group (http://etv.gatech.edu) in collaboration with Turner Cartoon Network, SONY, and the AFI Digital Content Lab. The problem posed at that time was how players would watch broadband TV, in particular the popular cartoon adventure, *Ben 10*, from a networked game console. The industry partners pursued a rapid development path of creating a casual game separate from the unfolding TV show, but the Georgia Tech eTV team focused on reinforcing the immersive experience of the television program by creating an experience that afforded dramatic agency [21]. The approach of the resulting *SyncGame* was to reinforce the reality of the objects within the story by letting the player grab them, collect them, and use them in ways similar to the ways in which they were used in the story. The core functionality of the original Flash *SyncGame*, built under the direction of Sergio Goldenberg, is the collection of objects as a player watches a TV show [22]. As the show rolls, the program shows icons of collectible items that will become available for collection in an own interface bar

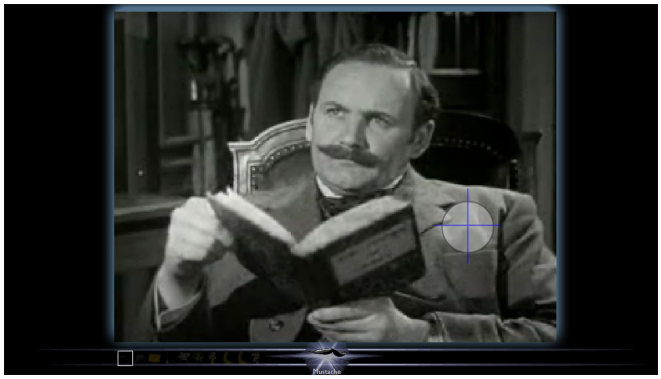

Fig. 2. TV collection game; the lower bar indicates items that can be collected, the cross hair allows selection of objects

(see fig. 2). When the items become available a half-transparent overlay appears over them and players use a cross hair device to select these items while they are on screen. Using Flash's frame counting feature, the parallel stream of these items and their availability is synched with the TV program.

NGP adapted this system and developed it further. When an item is collected, its unique ID is sent to the central mysql database. The objects themselves are stored in a sister XML set that contains each particular item's graphics, animations, behavior, and other information such as associated URLs or text descriptions. For example, collecting a ballerina's dancing shoe from the *Sherlock Holmes* episode depicted above includes access to the shoe's appearance, a URL, text description, and a given behavior of that shoe in the 2D game setting. In our case, that shoe can work like a power-up for any player who picks it up and will allow characters to jump higher in the 2D game world.

This separation of active objects allows us to gradually add more interactive objects to the game environment without complicating user management.

3.2 Handheld Game

Originally targeted to explore possible applications for upcoming 4G networks, NGP currently is implemented using local Wi-Fi (802.11g) and TCP calls to simulate possible future networks performance. When players initiate a game session they activate a procedural level generator on the server side. NGP creates a new game world for every game instance to provide a new and personalized gaming experience every time the game is played. First, it reads an XML file located on our server that contains the information for every object available in the game – including the objects in the participating players' inventories. Once the multiplayer public game server has accessed the database it merges both players' XML data to allow NGP to use their combined inventory in the shared level. This was achieved by appending data to Hash Maps but placing exceptions for identical keys.

The combined masses of collected items are utilized as enemies, pick ups and power ups. Then, the generator on the server side has to determine the size of the

level and create a passable skeleton pathway through it to guarantee that every level can be finished and no dead ends are allowed. Such a path is created with the help of simple AI pathing methods as the generator checks the level architecture. Finally, this level is populated with the virtual objects collected from the TV inventories of all players involved in this game session. The final result is a XML that is sent to the handheld devices and contains all the necessary level information as well as information about the objects inside of the level. Figure 3 shows one resulting level of the game and includes a champagne bottle and an automobile as possible pick up elements. Both of these elements have their own particular behavior and appearances.

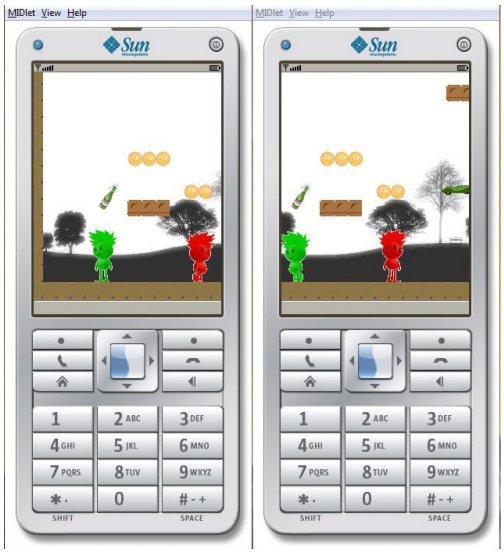

Fig. 3. NGP in-Game screen shot (taken from the emulator) with two active players at the starting location of a generated level

All networking is done through TCP wireless protocol. We can combine multiple inventories but concentrate at the moment on 2-4 multiplayer sessions. This restriction is also dependent on the limitations of our hardware platform (Nokia N80 phones). Because the game section on the handheld device is separated from the core database, the architecture allows for different possible game and non-game implementations based on the virtual inventories. Our overall system is genre-agnostic and virtual objects could be re-used in manifold ways to create new game experiences.

The original 2D game was coded in Java and later ported to J2ME. The handheld casual game is a multiplayer 2D platform jump'n run game designed for up to four players. Players find their avatars surrounded by key items of combined TV narratives assembled into a unique new mixture. The objects re-appear as interactive operators. A collected car might turn into a special ability for the player to move faster, a champagne bottle into a "floating ability" that reduces gravity, a villainous character might re-appear as a computer controlled enemy. The object behaviors are included in the overall XML level file generated on the server. The only part pre-existent on the phones is the game engine itself.

Finally, NGP offers the chance to trade virtual items via the "share" option. This opens up a menu of items owned by all other registered players. Here, the player accesses a catalog of available items from the server. From this list of items, players can select the desired one and are then shown a list of items that they own. They then select the item they would like to trade for their initial desired item and the owner of desired item in question is sent a notification to either confirm or reject the offer. The notification is passive and will be shown to the item owner at the start of their next online session.

The first stage of the NGP project was implemented on a Sony Vaio UMPC running Java and was subsequently ported to Nokia N80 cell phones and J2ME. Because of our technology choices, the only consistency that we required among the hardware was that the machines are capable of running the Java virtual machine and were able to make URL requests through a TCP connection. This leaves our underlying architecture open for future extensions.

4 Conclusion

NGP effectively connects traditional storytelling media with interactive game settings across different technical delivery platforms. It is player-centered insofar as it uses the personal preferences of each player as a distinguishing factor for the game generation. Each individual player influences the outcome of the level generator – but the combination of multiple players makes any prediction of the resulting game world impossible. As such, NGP is one example for cross-media multiplayer-driven content creation and it demonstrates the power of the player as a factor in the game creation and content transformation.

Our hope that the sharing of digital items in a game world can foster ad hoc and direct player interaction has yet to be proven and has been known to be problematic in other projects [23]. However, to support more interaction with physical surrounding, we also added a Quick Response (QR) code reader based on the ZXing open source library to the mobile application. With the help of this reader, players can collect media objects not only from TV media but also from any visual representation form that can display QR codes (fig. 1 shows a coffee cup as collection point). Therefore, the range of traditional media that can interface with the system can be extended and include, for example, newspapers, books, billboards, or product packaging. Players can collect virtual objects from any of these real-world sources and add them to their inventory. In that way, a closer connection of the gaming inventory to the physical shared environment of the players is provided and interactions can become better situated in the real world. Overall, we hope to use technology like the QR code reader to simplify the system further and widen the available media pool to increase the power of players and involve them further in the ongoing media transformation.

NGP has been presented at multiple occasions to a wide range of audiences from mobile tech professionals in industry and academia to regular casual mobile phone users. Its value for a range of commercial applications from more effective product placement to cross-media storytelling and edutainment were instantly recognized by many players – experts as well as interested casual users. We conclude that the connection of traditional media content and nonlinear re-use of virtual objects seems to

be generally accepted and players seems to be ready to build their own experiences in projects that use a multiplayer-centric design. NGP offers a cross-media example for such a design.

Acknowledgements

The Next Generation Play project is possible thanks to generous support from Alcatel-Lucent.

References

1. Ursu, M.F., Thomas, M., Kegel, I., Williams, D., Tuomola, M., Lindstedt, I., Wright, T., Leurdijk, A., Zsombori, V., Sussner, J., Myrestam, U., Hall, N.: Interactive TV Narratives: Opportunities, Progress, and Challenges. ACM Transactions on Multimedia Computing, Communications, and Applications 4(4), 1–39 (2008)
2. Mateas, M., Sengers, P.: Narrative Intelligence. John Benjamins Publ. Co., Amsterdam (2002)
3. Cavazza, M., Donikian, S., Christie, M., Spierling, U., Szilas, N., Vorderer, P., Hartmann, T., Klimmt, C., André, E., Champagnat, R., Petta, P., Olivier, P.: The IRIS network of excellence: Integrating research in interactive storytelling. In: Spierling, U., Szilas, N. (eds.) ICIDS 2008. LNCS, vol. 5334, pp. 14–19. Springer, Heidelberg (2008)
4. Morningstar, C., Farmer, F.R.: The Lessons of Lucasfilm's Habitat, pp. 273–303. MIT Press, City (1991)
5. Steinkuehler, C.A.: Cognition and Literacy in Massively Multiplayer Online Games. Erlbaum, City (2008)
6. Gee, J.P.: What Video Games Have to Teach Us about Learning and Literacy. Palgrave Macmillan, New York (2004)
7. Taylor, T.L.: The Social Design of Virtual Worlds: Constructing the User and Community through Code. In: Proceedings of the Internet Researchers Conference. Peter Lang, New York (2002)
8. Nitsche, M.: Claiming Its Space: Machinima. dichtung-digital, 37 (2007), http://www.dichtung-digital.org/2007/nitsche.htm
9. Ryan, M.-L.: Possible Worlds: Artificial Intelligence and Narrative Theory. Indiana University Press, Bloomington (1991)
10. Ferdig, R.E.: Handbook of Research on Effective Electronic Gaming in Education. IGI Global, City (2008)
11. Mazalek, A., Davenport, G.: A Tangible Platform for Documenting Experiences and Sharing Multimedia Stories. In: Proceedings of the International Multimedia Conference, Berkeley, CA, pp. 105–109. ACM, New York (2003)
12. Fischer, G., Giaccardi, E., Eden, H., Sugimoto, M., Ye, Y.: Beyond Binary Choices: Integrating Individual and Social Creativity. International Journal of Human-Computer Studies 63(4-5), 482–512 (2005)
13. Marino, P.: 3D Game-Based Filmmaking: The Art of Machinima. Paraglyph Press, Scottsdale (2004)
14. Szentgyorgyi, C., Terry, M., Lank, E.: Renegade gaming: practices surrounding social use of the Nintendo DS handheld gaming system. In: Proceedings of the Proceeding of the twenty-sixth annual SIGCHI conference on Human factors in computing systems, Florence, Italy, 2008, pp. 1463–1475. ACM, New York (2008)

15. Dobson, J.: Survey: PopCap Releases Casual Game Findings. Gamasutra.com, September 13 (2006), http://www.gamasutra.com/php-bin/news_index.php?story=10861
16. Jansz, J., Martens, L.: Gaming at a LAN Event: The Social Context of Playing Video Games. New Media & Society 7, 333–355 (2005)
17. Taylor, T.L.: Play between Worlds. Exploring Online Game Culture. MIT Press, Cambridge (2006)
18. Ducheneaut, N., Yee, N., Nickell, E., Moore, R.J.: Alone together?: Exploring the Social Dynamics of Massively Multiplayer Online Games. In: Proceedings of the SIGCHI conference on Human Factors in computing systems, Montreal, 2006, pp. 408–416. ACM, New York (2006)
19. Dourish, P.: Where the Action Is. The Foundations of Embodied Interaction. MIT Press, Cambridge (2001)
20. De Kort, Y., Ijsselsteijn, W.A.: People, Places, and Play: Player Experience in a Socio-Spatial Context. ACM Computers in Entertainment 6(2), Article 18 (2008)
21. Murray, J.H.: Hamlet on the Holodeck. The Future of Narrative in Cyberspace. MIT Press, Cambridge (1997)
22. Goldenberg, S.: Creating augmented and immersive television experiences using a semantic framework. In: Proceedings of the 1st international conference on Designing interactive user experiences for TV and video, Sillicon Valley, 2008, pp. 45–48. ACM, New York (2008)
23. Li, K.A., Counts, S.: Exploring social interactions and attributes of casual multiplayer mobile gaming. In: Proceedings of the International Conference on Mobile Technology, Applications, And Systems, Singapore, 2007, pp. 693–703. ACM, New York (2007)