Evaluation of Crossmedia Gaming Experiences in *Epidemic Menace*

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ABSTRACT

Crossmedia games offer different alternative gaming interfaces to a player. This paper presents the results of an evaluation of the player experiences in the crossmedia game *Epidemic Menace* and focuses on the characteristics of the gameplay, the story and the intertwining of these two central concepts of game design. In this context the paper discusses replayability, minimalist role-play, immersion, and task-specific roles and gives insights for the future design of pervasive crossmedia games and crossmedia gaming experiences.

Keywords

Pervasive Games, Crossmedia, Evaluation, Game Design

INTRODUCTION

Epidemic Menace is a game played for three hours on a designated gaming area with a variety of different gaming interfaces [5]. It is the second version of a prototype game developed in the IPerG project[1].

Epidemic Menace is based on the following story: a professor working for a secret medical research laboratory has found a dangerous new medical virus that could have the potential to extinguish human life. He has found several lethal mutations of the virus, which are transmitted via organic material but has luckily almost been able to come up with an antivirus. Unfortunately someone has stolen the virus and managed to contaminate the research campus. Two competing squads (the players) of four medical detectives EEPA-X and EEPA-Y are brought in to resolve the case and clear the area.

The overall goal of the game is to prevent the virus from escaping the campus, to catch all the viruses that have escaped, create an antivirus and to find out who contaminated the campus within three hours. The players are rewarded with video clips that reveal parts of the truth during the course of the game. The winner is the team that gets the highest score (points are awarded for capturing

viruses) and makes the right decision on who the villain is. Each team receives a number of devices during the course of the game supporting different modes of play.

The main modes of play are *stationary play* and *mobile play*. The stationary players are locally situated indoors in the headquarters of the team they belong to. Figure 1 shows the headquarters. In the stationary play mode players have at their disposal a control board on a large touch screen display showing the gaming-area map, a communication station that provides means to communicate orally with the mobile players via headset, an observation station showing the augmented video stream (the park and the viruses) of the gaming-area and the image of the other team's headquarter, a weather station providing weather details for prediction of virus behaviour (wind direction), a decision station where players have to make crucial decisions on the game story (e.g. decide who the thief of the virus is) and a laptop to view video messages provided by the game management.
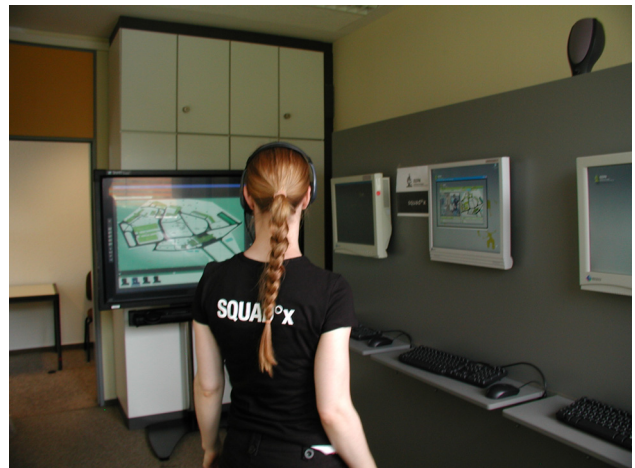

Figure 1. Stationary mode of play in the headquarters of a team. The picture shows the control board (left) and three other stations (right).

The stationary players' tasks are to coordinate the hunting activities of the mobile players, to monitor their health status, to watch the other team's activities and to decide on

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[1] http://www.pervasive-gaming.org

the next steps of actions after having viewed a video message.

The mobile players are spatially distributed on the gaming area, outdoors. Their job is to capture as many viruses as they can. Since they compete with another team, speed is a crucial factor when playing outdoors. The mobile players have at their disposal a Global Positioning System (GPS)-tracked Personal Digital Assistant (PDA) sending the player's position via WiFi to the game engine, two smart phones with a dual purpose, one to communicate with the headquarters via headset, and another to capture viruses with the implemented application, and a mobile Augmented Reality system. A player can either use the smart phone or the Augmented Reality system to capture viruses. Each team has both stationary and mobile players and during the course of play players are rotated between the two teams. Figure 2 shows a player carrying the mobile Augmented Reality-system.

Figure 2. Mobile mode of play outdoors. The picture shows a mobile player about to capture a virus (shown in Augmented Reality representation).

The game is played in a combined physical and virtual game space and teams have to play in this augmented space in order to capture the viruses. The virtual game space is a model of the physical game space and game appearance and game mechanics are adapted in the physical and the virtual game space. For example, the virus appears differently in both spaces.

In the physical world the virus may appear either on a 2D map-based interface that displays the viruses in the gamers' proximity, or as an overlaid 3D graphic on the Augmented Reality devices. In the virtual world the viruses may appear as animated 2D and 3D graphics.

Epidemic Menace was run four times with two teams each session on July the 6th & 7th 2006 on the Campus Birlinghoven, near the city of Bonn in Germany. In total, 29 players played the game. To get a rich picture of the gamers' experience of the interaction with the game and to elicit the research areas, a mixture of methods was used to evaluate *Epidemic Menace*.

This paper is structured as follows. First, we describe the objectives of evaluation that are depicted in this paper and justify the relevance of the selection of objectives. Secondly, we explain the research and sampling methods employed to evaluate *Epidemic Menace*. In the following main part, we present and discuss the results of the evaluation relating to the objectives of this paper. Finally, we summarize and conclude the findings. The results presented in this paper are based on the evaluation of the second prototype of *Epidemic Menace*, unless we explicitly relate to the first prototype.

OBJECTIVES

The goal of the development of *Epidemic Menace* from a business point of view was to create a game that is commercially viable. To be commercially viable, a game has to be an enriching experience for the players. Therefore, we focus on the evaluation of the player's experiences within the context of a crossmedia game that offers different game experiences to its players via a variety of gaming interfaces. The context is a special challenge for the evaluation because the players act in a crossmedia state during play, transcending between virtuality and reality, utilizing a variety of gaming interfaces to "connect" to the game. The crossmedia-typical challenge is to integrate the employed gaming interfaces in a way that the concept of the game is perceived as a coherent whole despite the loose coupling of the interfaces. By gaming interfaces, we do not only understand technical gaming interfaces, but also humans, such as in our case, a professional actor.

Which gaming interfaces are used in which way – e.g. to support a certain task or to transport a certain message – is the result of deliberate design decisions that aim to create an enriching experience. Every design decision creates certain implications, a lot of which are not intended by the designer. These decisions are subject to this evaluation with respect to business aspects.

The approach of this paper is to look at the design traits of the game that the evaluation revealed to be the most important ones: the characteristics of the gameplay, the story and the intertwining of these two central concepts of game design and their impact on the player experience will be subject of this paper. Schell [8] described the two concepts, the gameplay and the story, as fundamental for entertainment. As we will see, the design decisions have crucial impact on the experience and also on the commercial viability of the game – especially regarding replayability.

This paper stands out by looking into the feasibility to integrate two fundamental concepts of games and its impact on the player experience in a crossmedia environment. Challenges and chances of designing enriched player experience for crossmedia games as a fundament for commercial viability are developed on the basis of an empirical evaluation.

RESEARCH METHODS

To get a rich picture of the gamers' experience of the interaction with the game and to elicit the research areas, a mixture of methods was used to evaluate *Epidemic Menace* empirically. Pre- and post-test questionnaires served to collect quantitative data. Observations during the game as well as interviews and feedback discussions at the end of the session contextualize these data qualitatively and give room for emergent issues.

During the evaluation, we applied a broad point of view to explore the wide research field of crossmedia gaming. However beneficial an empirical study is that tests pre-formulated hypothesizes, the explorative approach let issues emerge that otherwise would not have been presented here.

Quantitative methods

The player answered a number of questionnaires. Demography and general gaming habits were covered in an application questionnaire. To be able to compare the players' final feelings toward the game they were asked to state their expectations prior to playing in a pre-test questionnaire. More detailed issues on gaming behaviour and gaming experiences were also covered in the pre-test.

The post-test online questionnaire covered the issues regarding the gaming experience. We wanted to know, if the game met the players expectations regarding game story, fun, technolog,y, cooperation, competition, learnability and look and feel. We asked them to respond to statements mostly using a five-point Likert scale. We operationalised a wide range of relevant issues, e.g. game story and gameplay, joy of use and experience design, usability and modes of participation. For example, we wanted to know if the time flew by the player during the game, if they felt the game story to be a coherent whole, if the game world felt like a coherent whole despite the dispersed interfaces.

Qualitative methods

Observation took place in the background. The players were observed through the use of four webcams and when they were playing outdoors, the players were also observed from a distance. Unfortunately the gaming rooms were not equipped with microphones and thus the observations are based purely on visual, aside from a few snippets of conversation overheard outside, the observations lack an aural component.

After the game the players also took part in semi-structured thematic group interviews, where the gaming experience was discussed. These were used to enhance understanding player feedback, and to deepen and explain the answers given in the survey.

The sample

The players were recruited from email distribution lists with an overall estimated coverage of 16.000 readers. Among them were journalists and students (school and university). The invitation mail included a link either to the *Epidemic Menace*-website[2] or directly to an online-poll where they were asked to provide information for their application as a game tester. 58 potential players applied as a game tester.

The potential players (n=58) were asked about their gaming habits in the application. 50 of them responded that they played computer games very often (33) or often (17), clearly sending console games (19 nominations for very often and 13 for often) and sports (18 nominations for very often and 13 for often) off to second and third place. On the low end of the scale the potential players named Live-Action Role Playing (31 nominations for never and 19 for sometimes), and mobile games (29 nominations for never and 14 for sometimes),[3]

As pervasive games mix different types of classic gaming genres we want to attract a more diverse target group in the future. Different causes of a group of interest leaning toward computer games are conceivable, e.g.:

- The communication / advertisement of the gaming event attracted people usually more into computer games than others.

- The heavy use of modern technology frightened away gamers that usually play "low-tech" games, e.g. parlour games.

- The sample represents the population of gamers well, meaning that computer games attract the widest audience in general and the responses indicate a valid distribution of gaming habits.

From the applications 32 players were chosen randomly (8 teams, 4 teams for each day). On the test days not all of these players showed up, so in one session, 2 Fraunhofer FIT employees not previously involved in the IPerG project or the game joined as additional players. In the end 29 players played the game, 19 of these were contacted through the invitation email, 2 were cast on the spot, 5 formed the "international team" and were invited by an IPerG-member. Two players played the game twice and one of the players had also participated in the game a year earlier during phase one.

23 (actual) players filled out the application questionnaire. The majority of 18 players was between 20-29 years old, one was younger than 20, two players were between 30 and 40 years old and two players were older than 40. The youngest player was 18 and the oldest 60 years old. The average age was 27.

The biggest problem with the invitation email turned out to be the lack of interest it raised in women. Only one woman applied for the game. In the end the game was played by two women, the second being a Fraunhofer employee. As

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[2] http://www.epidemic-menace.de

[3] Due to lack of space, we can only present a selection of the results in this paper.

the women enjoyed the game pretty much the same as the men, it is possible that the problem was with the advertisement, and not in the game design.

The players' backgrounds were quite diverse. 4 of them have a secondary education, 11 have college level education (most of them are students), three have a polytechnical degree and five have a university degree. The professions are diverse as well, 9 of them have a profession somehow related to technology or even computer sciences and game development (4 of the 9).

Only one group (referred to as the "international team") applied as a group, the rest applied individually and did not know each other.

A Word on Representativity

Since the population is unknown empirical research usually works with a sample. That sample is best chosen randomly to avoid a biased view of the population – to get a representative sample. However, the evaluation of *Epidemic Menace* required the participants to travel to the campus. Also, they were obliged to fill out a questionnaire without knowing if they were allowed to participate. The initial contact was made by an advertisement, something they had to actively react to. Despite that the sampling method does not allow a random sample we assume that the sample represents that part of the population that is interested in playing pervasive games. Therefore, we hope that we received valuable answers of a sample that represents the target group of potential players of pervasive games.

RESULTS

Briefly, we will state relevant results with respect to the objectives from the post-test questionnaire (n=28) that we will contextualize and refer to again in the discussion of the results in the next section. Without interpretation and context provided by feedback discussions with the players and observations, the rest of this section is just data. The reader may well skip this.

Concerning the game story, 11 (39%) players agreed and 6 (21%) players agreed strongly with the statement "my expectations towards the game story have been fulfilled", 8 (28%) were undecided and 3 disagreed. 12 (42%) players agreed that "the actor fit well into the game experience", 14 (50%) agreed strongly, only two were undecided. Furthermore, 14 agreed that "the actor helped [them] to feel as a part of the game", 8 agreed strongly and 6 were undecided. When asked to correspond to the statement "I perceived the story as a coherent whole", 9 (32%) remained undecided, 8 agreed and 7 strongly agreed; 4 disagreed.

With regards to gameplay, 11 players agree that their expectations towards "fun of play" have been fulfilled, 10 (35%) agreed even strongly with this statement, while 4 were undecided and 3 disagreed. 12 (42%) players strongly agreed that their expectations towards "competition against the other team" were met, 3 agreed and 10 were undecided; again, 3 disagreed. 22 players

(78%) agreed strongly that "cooperation was necessary to play the game", 4 agreed and 2 were undecided. Additionally, 15 players agreed that "to cooperate, players have to take on specific roles", 5 agreed strongly, while 5 were undecided and 2 disagreed. Supporting this, 13 players agreed with the statement that "I had to take on different roles", 4 agreed strongly and 8 remainded undecided; again, 2 disagreed, one even strongly.

We wanted to know if the player felt that the device he or she operated determined the role in the game. If yes, this would be inherent in design. 14 players agreed with the statement "the device I operated determined the role in the game", 6 agreed strongly and 6 remained undecided; 2 disagreed. Vice versa, 12 players disagreed with the statement, "the role I played in the game was independent of the device I operated", 8 even disagreed strongly, 2 were undecided; 5 agreed, one strongly. Paralleling this, 11 players agreed that when switching the device they also switched the role they played, 10 even agreed strongly; 2 were undecided, 3 disagreed, and 2 strongly disagreed.

To overall assess the crossmedia-inherent challenge of building a coherent game world, we asked the players to correspond to the statement "the game felt like a coherent whole despite different devices and gaming interfaces". 78% agreed or strongly agreed with this statement (see fig. 3).
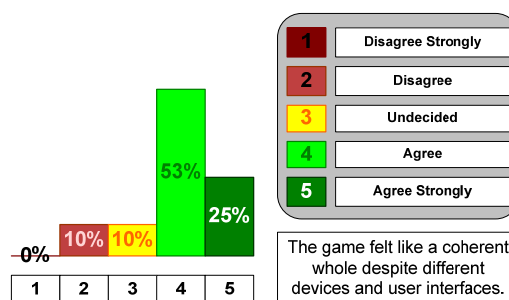

Figure 3. Coherence of gaming interfaces.

FRAMING THE RESULTS: DISCUSSING OBJECTIVES

Setting up a crossmedia game like *Epidemic Menace* with specific hardware that requires on-the-spot support is expensive. To be commercially viable, the game has to attract a wide audience and has to be a rewarding experience for the player with the potential to be played more than once. In a nutshell, the game must be replayable. According to Grodal [4], the pleasure of playing games is characterized by the aesthetic of repetition. It is rather straightforward to acknowledge the difficult task of making a story-driven game replayable – especially in the case of *Epidemic Menace*, where one of the tasks is to identify the villain. A central problem with creating story-driven games is that once the game is over, the player is unlikely to want to play the same game a second time. However, with *Epidemic Menace*, this was not true. Surprisingly, 27 out of 28 players replied in the post-test questionnaire, that they

would like to play the game again. This may be due to the curious nature of the sample – as indicated above, the players had to overcome a number of obstacles to take part in the event at all.

In the opinion of the authors, this finding is due to another aspect: the replayability of *Epidemic Menace* depends on whether it is seen as a story-oriented game or a competition-oriented game. To the players, the competitive aspects seemed to overweigh the story-driven character.

> "The story is more an introduction; afterwards it is the competition that dominates the game. The story is just a cover for the action. [It] doesn't need a story to work.[4]"

Game Story

If the story is seen as a mere introduction, why not abandon a story altogether? A story creates the game world. A story contextualizes the action and the performing of functions within a game. It enriches the actions with meaning and helps the player to immerse into the game world. It provides moments of relaxation where the player can lean back and perceive, get a rest from the action. In *Epidemic Menace*, the moments where players consumed the story also provided valuable time for the game masters to set up or restart the game engine and therefore served the pragmatic purpose of decreasing the prototypical character of the game.

When asked about their feeling towards the story, the majority of players approved of the sheer existence of a story. As pleasantly surprised the players were by the fact that there actually was a story in the game, as demanding were their expectations. 9 players said that the story was too simple or that they had wished that the story was more complex, that the plot revealed too quickly or that the characters were too predictable.

What was also criticized is that the story had a "breaking point" when switching from stationary play indoors to mobile play outdoors. Players wished to have other means of storytelling for mobile play as well – the story was transported via video clips and by the effort of a professional actor who took on the role of a medical professor. The players all said that they really liked the "professionally made" videos and the acting. 26 players agreed with the statement "the actor fit well into the gaming experience" and 22 said that "he helped them to feel as part of the story line" in the post-test questionnaire. A lot of players were unaware that he was an actor until the game was over!

Epidemic Menace was better at intertwining gaming and storytelling when playing stationary than mobile, since video clips that revealed the plot step by step were also handed out and watched indoors.

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[4] Unless indicated otherwise, quotes are from post-test interviews with the players.

The story was also criticized. This player's critique shows another inherent challenge of Crossmedia games:

> "You see movie, you see locations, but you don't see the location in the game. You need to integrate the things better. If you need to test it more, you need to integrate it more."

The problems with the story rose from an incomplete game world. The video segments were presented as if they were cut scenes from a computer game instead of being actual footage that the virus hunters might see. Another problem was that the video cut from one angle to another and zoomed, something that surveillance cameras do not do. The videos were perceived as too slick – players said that they should have been black and white grainy surveillance tapes. From the perspective of game design, video pre-production has to be planned for the location the game is staged at, taking into account that players might be confused if the location on the video is supposed to be recorded at the same location. This can of course be limited by avoiding to film recognizable landmarks.

Gameplay

The gameplay is central to a game. The concept is widely acknowledged in the discourses of game culture as describing the "essential but elusive quality that defines the character of a game as a game" [3]. Here, we will not engage in a discussion about the definition of gameplay. We assume that gameplay is the contextual acting of the players within the game to reach a certain game-relevant goal.

In the case of *Epidemic Menace*, the gameplay is rather simple: Two teams compete for capturing the majority of viruses. To achieve this, cooperation within the team is required. The headquarter coordinates because the players there see the location of viruses and players outdoors, while the players outdoors rush to the location to capture the viruses.

The very ludic competition with the other team was perceived as fun by most of the players. Most of them seemed to follow the score during the game and the players who got to play the final part of the game (capturing of all the remaining viruses) reported that that was the best part of the game (the scores were even, so there was an added element of excitement). As the competition took over, the story faded to the background. It was merely a framework for the action.

In the interviews as well as in the feedback discussions, collaboration and teamwork came up again and again as one of the major advantages of the game. In the post-test survey only one player didn't mark co-operation as a positive ingredient and he was undecided, not negative. A number of interviewees commented that the real-life physical interaction and cooperation with other participants was fulfilling.

All interviewees reported that their group had felt like a team. Many commented that the drive to win, the

competition aspect, is the ingredient that hastened the forming of the team.

> "Playing in a team is a lot of fun. If you were alone it wouldn't be fun."

The fact that the players didn't know each other (except for the "international team") seemed to support the uptake of the *functional roles* (see below) that the game required (such as virus hunter, coordinator at the headquarters). It was easier to slip into the roles with no one present who the player had to relate to in his everyday persona. Roles in games are usually associated with Massive Multiplayer Online Role-Playing Games if played digitally or Live Action Role-Playing if played in the real world. *Epidemic Menace* however, lacks an important "invisible rule of role-playing" [6], the rule that players "define the game world through personified character constructs" [ibid.]. Players were not provided with imaginary names or character fiction such as special powers.

Minimalist role-play

Unsurprisingly, most of the players reported in the interviews that a game character, a complete identity within the game diegesis, did not emerge. The ones that were able to construct a role described the roles through action. They felt like they were in the game and in the role when they were doing something. Usually inaction led to stepping out of the game – especially in those sessions where there were a lot of technical difficulties.

In sessions that ran more smoothly the shorter empty moments did feel like part of the game and the roles were present in the immediate action as well. Players could, for example, plan what they would do next.

> "I was really into the game. Sometimes I looked at my watch because there was a countdown at the display. So we had not much time. [I was] the whole time into the game. One hundred percent. [From session with very few tech breaks.]"

Thus, it would seem that in *Epidemic Menace* the roles emerged from action and if the action was in good enough shape, then the role could be sustained during inactivity as well. One of the participants compared the role to a profession.

> "I felt like myself playing a role, like given an occupation, like someone would have come to my home and offered me a job."

"Despite the lack of character" Montola observes, "*Epidemic Menace* had game-based roles that were created by different devices and interfaces the players were using" [ibid.]. He calls that kind of gaming created through functional roles *minimalist role-playing*.

> "*[M]inimalist role-playing* could be very efficient in creating interesting player interactions in many games while avoiding the aversion and stress of performative

gaming often experienced by casual gamers who are forced to role-play. The ludic part of the player's story of self is separated from the everyday story of self, but the self that plays is seen as a subset of the ordinary self. In full-fledged role-playing games the pretence of character not being the player is central" [6].

The players who had a background in role-playing games (RPG) were more likely to use RPG-influenced terminology when describing their experience, but the emergent minimalist role-playing was in no way limited to them.

> "I switched between control team and swat team; it was a completely different role. I think that control makes the game. This game would not have been possible in classical way and that's what I like. Not a different character, but a different role."

Based on the evaluation of *Epidemic Menace* the following things support minimalist role-playing:

- Playing with strangers. It was easier to slip into the role if there was no one present who the player had to relate to in his everyday persona.

- Good game flow. If the game didn't have too many interruptions due to technical problems, then it was easier to be swept away by that and immerse into the game world.

- Perception of a coherent game world. Those players that were bothered by discontinuations in the diegetic world were more prone to report a lack of role.

- Role-specific dress. The t-shirts helped immersion, but some players were disappointed when they did not get contamination suits when going outside.

The following hindered minimalist role-playing in *Epidemic Menace*:

- Unclear instruction and incomplete game world. Some players didn't know if they could exit the room at will, if they could go out on their own. It doesn't matter what the rules are but the players want to be aware of them.

- Too much down time. Having some gaps in the game doesn't break the engagement, but having nothing to do for longer periods of time will break the role-playing.

- Encounters with non-players or players who are not playing. Some player reported that passing cars and bystanders broke their illusion as according to the story there wasn't supposed to be that many people there. Also, running into another player who is not playing (for example, from the opposite team) broke the illusion in a second as well.

Enriching competitive gameplay with story

The difficult task of intertwining an immersive story and a competitive game building towards and experience of flow

did not quite succeed. Players wished to have a more complex story on the one hand and felt a breaking point between playing indoors (story-driven) and outdoors (gameplay-driven) on the other hand. Seamless integration of story and game mechanics has yet to be proved successful. Nevertheless, the players liked the acting and the fact that there actually was a story at all. As we will show, the use of a *story world* fosters mental immersion, whereas the competitive game mechanics build towards an experience of flow when game-related action sequences become increasingly automated.

Immersion into action and flow are important ingredient in fostering the player's experience of the gameplay. Ermi and Mäyrä [3] have studied children's gaming. In their report they divide immersion into three subgroups: *sensory immersion*, *action based immersion* and *mental immersion*.

Sensory immersion is achieved by being overwhelmed by the audiovisual environment of the game as well as the multimodal environments created by newer games (with the addition of such elements as vibrating game controllers).

Action based immersion is tied to the experience of flow as described by Mihaly Csikszentmihalyi [2], where immersion is created by being constantly challenged by the game. Being alert and focused on the game is required to succeed in the game and the flow is achieved by striking a balance between challenge of the game and abilities of the player.

Mental immersion is created by a believable and coherent game world where the player can identify with the characters, be transported into the game world and experience the narrative. This type of immersion grants the player access to the fantastical world and can also offer the experience of empowerment [3].

Epidemic Menace uses a plethora of different devices which create an environment for sensory immersion. Nevertheless, this type of immersion could be improved immensely by incorporating for example music, alarms and screams. Today, the aural possibilities of building an atmosphere were almost completely unexplored. In the game the competitive gameplay supports action-based immersion or flow whereas the story supports the mental immersion into the game. However, instead of a set story, a coherent *story world* might be a better alternative. In the sense of the Ermi-Mäyrä model, the concepts of competitive gameplay and story (or *story world*) in combination add to a more enriching game experience.

Task-specific roles

The evaluation of the first prototype yielded some interesting results concerning collaboration that players took on different roles in the teams. It was discovered that mobile players took on roles of "snoopers" and "communicators" and stationary players took on roles of "communicators" and "tacticians" [7]. It seemed that the roles players took on did not only follow from their inside (stationary) or outside (mobile) play, but were also due to the type of device they used. It was assumed that players take on *device-specific roles*. Special attention was paid during the 2nd evaluation to the emergence of roles due to the type of device the players carry. Before the game it was postulated that the device that a player uses would determine the role that she plays in the game. The observations, interviews and surveys support this hypothesis only partly. A number of players reported that when they switched between playing inside in the control centre with head phones and the touch screen and when they went outside to play with the mobile phone and the mobile Augmented Reality system they were indeed playing slightly different roles. Yet it would seem that the role was not so much influenced by the device they were using but by the context and the "job description".

> "First I was on the headphones all the time, then I went outside, I wanted the experience of to play both sides of the game. The equipment didn't really influence me; I think it was the location that influenced me. Because when I was inside I could say go left, go right… When I was outside I had to rely on the people inside. Inside I was more nervous, because I saw when I navigated one of my team mates right into the viruses. Outside I didn't care because I couldn't see where I was going; I had to rely on them [the people inside]."

If the device had indeed been the source of the role, then there should have been a clear difference between using the mobile phone and the mobile Augmented Reality system. However, there was no observable distinction between these and none of the interviewees mentioned it either.

To accommodate this insight, we altered our thesis in this important respect: the concept that best describes the distinction between roles from a functional point of view is *task division*. The roles are not device-specific, as assumed, but rather task-specific. This concept also caters for the fact that players did not feel a difference in role between playing with the mobile Augmented Reality system and the mobile phone.

The minimalist roles are task specific due to the task the currently used device supports. The stationary control screen provided an overview of the gaming location and the actual location of viruses and players. Furthermore, the room was equipped with a communication station. Therefore, the equipment *afforded* the task of coordination of the hunting activities outdoors. Players among a team were forced to collaborate because the outdoor players had by interface design a limited vision of the (virtual) gaming area and the indoor players had no means to capture the viruses from inside.

This finding has important implications to the design of crossmedia games. The technology, or more specifically, the devices that are used, are not the deciding factor in the way that players experience the game but the tasks or functional roles that are assigned to them.

Designing task-division for crossmedia

We have stated that the devices supported different tasks, the sum of which complement to allow to perform all the tasks necessary to play the game. Furthermore, we have argued the complemental purpose of story and competitive gameplay. In parallel to the task division, some interfaces aimed at supporting competitive gameplay while others served the purpose of transporting the story. All the devices with different purposes added up to a crossmedia environment. By designing for task division across devices we hoped to achieve that the interfaces added up to form a coherent whole in the players' perception. In the feedback discussion, some players said that they were surprised by how well the devices worked and communicated together, by the way they were "melted" together. In the post-test questionnaire, 78 % of the players stated that the game felt like a coherent whole (see fig. 3).

We already discovered in the evaluation of the first prototype of *Epidemic Menace* that players prefer to have a one-device-one-function assignment. Back then, it was criticized that the mobile phone served a dual purpose: it was used as a virus-capturer and as a phone in parallel. In *Epidemic Menace* two outdoor players were equipped with a mobile each, one for communicating and the other for capturing viruses. The findings also supports Buxton's thesis [1] that lesser functionality increases the usefulness of an interface.

The interfaces can be allocated to two general purposes of this game: story-transfer and gameplay. Figure 4 indicates which interfaces transport story and which interfaces supported the gameplay. The position of the interfaces in the ideal crossmedia game relying on story and gameplay would make up a triangle on the graph. The interfaces would either support story transport or gameplay highly, or both.
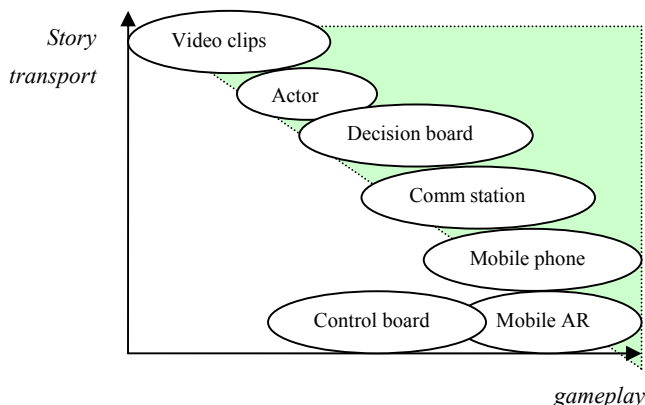

Figure 4. Story-driven gaming interfaces vs. gameplay-driven gaming interfaces.

In *Epidemic Menace,* the story-driven interfaces afford more passive player behavior. The players passively perceive the gaming interfaces that transport the story (the act of starting the video clips is taken for granted). The

mobile Augmented Reality system and the mobile phone are on the other extreme of the scale, urging the players to bodily compete to capture viruses (see fig. 5). The gameplay-driven interfaces afford rather active player behavior. The control board affords a less bodily, but still active gameplay. Interacting with the actor on the other hand doesn't just advance the plot; it is meaningful play in itself. However, it has no direct impact on competitive play.

The rest of the interfaces are borderline cases. The communication station can be seen as an integral part of the gameplay, but players are free to use it to communicate about the plot. The decision board mostly integrates the concepts of story and gameplay. Here, players have to actively decide (gameplay) who the villain is – the choice will influence the outcome of the game.

Figure 5. Players competing to capture viruses.

By designing for task-division and different purposes, coherence was achieved despite the crossmedia character of the game. Also, the purposes of the interfaces afford different types of player behavior: from passively perceiving to challenging bodily activity.

SUMMARY AND CONCLUSIONS

The task of integrating story and gameplay did not quite succeed. However, the experience of the game was fulfilling to the players. For instance, the players' ratings for the game were high. 74% rated the 'fun' of the game as very good or good[5]. Also, the post-game questionnaire yielded a significant commercial potential. 92 % of the players said they would play the game if it was commercially available, 96 % would play it again and all of the players would recommend *Epidemic Menace* to a friend (see fig. 6).

We have stated that this is probably due to competitive elements that outweigh the story elements during play in the view of the players. For future iterations of this game,

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[5] on the basis of the German school grades where 1 means very good and 6 insufficient

an option would be to concentrate on the competitive gameplay elements. Concentrating on the competition would take *Epidemic Menace* closer to exercise-heavy competition games such as *Paintball*, *Capture the Flag*, *Laser Tag* and *Megazone*. This design direction would call for fostering a flawless flow experience and immersion into action.

A major drawback of the story in *Epidemic Menace* was that it builds the story around characters – one of which is the villain. Now, the final task of the players is to identify the villain. Obviously, this task is superfluous when playing the game a second time. Fortunately, this drawback is not a trait of the concept story in general, but a particular problem of the particular story – a story could easily be written in a way to avoid this caveat for replayability.

As we also argued, a story has its right and purpose to exist. It frames and provides meaning for the action of the players. The moments where the player consumes the story lets her relax. Foremost, the mental immersion into the game is fostered by a story. We conclude that story can enrich the gameplay in important respects – to integrate it seamlessly into a game is a challenge that is worth to be taken on in the future.

Figure 6. Commercial potential.

A major advantage of crossmedia games is that task-specific minimalist role-playing emerges. Even player types that do not usually like RPG slip into a minimalist role. The extent to which a player takes on a role is up to her. One possibility would be to emphasize the *story world* instead of a set story. This would create a stronger basis for minimalist role-playing, foster mental immersion and raise the replayability factor.

Coherence of a crossmedia game world can be achieved by employing interfaces in a diverse, additive way. They can be designed according to task division and the overall purposes they support (story transport and gameplay). By using a graph in the style of figure 5, heterogeneity of the crossmedia environment can easily be evaluated *before* it is actually designed, to avoid possible breaking points between story and gameplay.

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