ME, US AND THEM: EVALUATION OF COOPERATION AND COMPETITION IN A LOCATION BASED SERIOUS GAME DESIGN.

Imran Beg & Jan van Looy

iMinds-MICT-Ghent University

Research Group for Media & ICT

Department of Communication Sciences

Korte Meer 7-9-11

B-9000 Gent – Belgium

Imran.Beg@UGent.be

Jan.VanLooy@UGent.be

ME, US AND THEM: EVALUATION OF COOPERATION AND COMPETITION IN A LOCATION BASED SERIOUS GAME DESIGN.

Introduction

Parallel to the growing interest in the deployment of digital games as an instructional tool for educational and social purposes and their theoretical underpinning and viability (Egenfeldt-Nielsen, 2006), the social aspect of gaming itself has also gained interest as in how various forms of human interaction in digital games and game play manifest. For example, Zagal, Nussbaum and Rosas (2002) developed a model for multiplayer game design to support initial steps in the design process of multiplayer games, proposing that social interaction depends on elements of the game (i.e. player(s), rules and goals, and props and tools) and characteristics of a multiplayer game. Moreover, mobile technologies offer new opportunities to embed and exploit multiplayer game and/or game features to various contexts, potentially adding an extra element to the human interaction and digital games, such as the spatial environment in which the digital game is played). For instance, due to GPS integration in mobile devices, game play progression in so called location-based games is based on players' interaction with certain game features in a predefined physical location. For example, Huizinga, Admiraal, Akkerman and Dam (2009) developed a mobile city game for students from secondary education to acquire historical knowledge and motivation for history. Likewise, Facer et al. (2004) developed a mobile game experience to encourage the development of children's conceptual understanding of animal behavior in a direct physical interaction with space and with other players. Due to new game formats, new media and technology opportunities, the social aspect of multiplayer digital gaming the complexity of optimizing game design and eventually game play rises. This paper therefore aims to further explore the competition and cooperation elements (Zagal et al, 2002) for a location-based serious game.

This study was part of a larger study aimed to design and develop a game-based road safety campaign from a user-centered design perspective using several mixed methods throughout the game development process (Pagulayan, Keeker, Wixon, Romero, & Fuller, 2003). The goal was to develop a serious game to enhance the awareness of road safety and to stimulate safe behavior on the road among adolescents. In the first part of the game development process a literature review, interviews and focus groups with relevant stakeholders resulted in a game design concept. [Reference removed to protect anonymity] involved stakeholders in a co-design sessions to gather input on the perception and needs of the target group on several

game mechanics. Insights obtained in part one led to the creation of a beta version of the game 'City Jam'. The game's goal is to become the most popular band of the city by collecting virtual items spread throughout the city center and therefore competing against one another in teams (four > team < ten); each team consists of two to four players and players have the option to cooperate given the game mechanics and features. In order to evaluate the results we considered a social hourglass shaped framework as to describe cooperation and competition during game play (see figure 1).
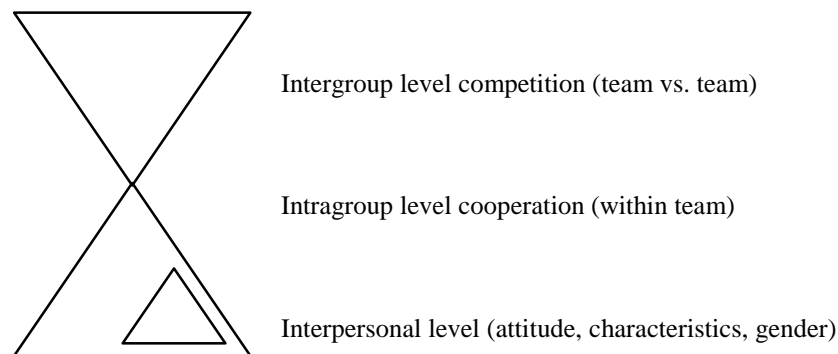
Intergroup level competition (team vs. team)

Intragroup level cooperation (within team)

Interpersonal level (attitude, characteristics, gender)

Figure 1. Social hourglass shaped framework of a cooperative and competitive digital game.

Methodology

Three field tests were deployed during the game development process of the beta version of the location-based serious game 'City Jam' with roughly one and a half month between each test. A total of 43 adolescents from the third cycle of secondary education were recruited from eight schools (see table 1).

Field test	Game testers (N=41)	Number of teams	Age range (years)	Gender	
				M	F
1	18	4	14-18	15	3
2	7	3	14-17	6	1
3	16	5	15-17	8	8

Table 1. demographics of game testers in the iterative testing phase.

Each field test consisted of two parts: the game test and a focus group held directly afterwards to evaluate the game play and experience among the target group. In preparation for each field test a checklist with predefined and/or adjusted goals to optimize game experience were established in collaboration with the game developer. Game mechanics throughout the development process were subject to adjustment based on the insights and results obtained in

the test phase. In the game test audio and video recordings were gathered with a Go Pro camera with head mount and audio recordings and survey data were collected in focus groups sessions with (a selection of) the game testers. A semi structured list was used as guidance throughout the focus group. Survey field test included game experience. However, given that the full final version of the game was developed after field test three, researchers evaluated the value of the Likert scale survey on its contribution and decided to reduce survey to open questions only: game testers were asked to write down the 3 most positive and 3 most negative experiences during game play. The field tests were held after school time in the low traffic city center. Each game test was approximately two hours and focus group sessions were around one hour.

Results

Our preliminary results from field test one showed that on the competitive level sabotaging other teams (dropping virtual bombs to steal points) was considered one of the most positive aspects of overall game play. Also, the menu function 'newsfeed' was also received positive as to obtain knowledge on the movements and actions of other teams (although not all teams used this function). Although game testers enjoyed the location based game (good concept), they stated that the game was seen as an individual rather than a team game. Discussing strategy, explaining game features was mixed from team to team and testers addressed that they were not always involved in the game given the restriction of game play on one tablet (size, visibility and walking makes cooperation difficult). Additional physical maps with information on items and scores for non-tablet holders for each team were often neglected during game play. Four promo actions (e.g. taking group pictures with virtual fans) were integrated as to promote cooperation and interaction, however, actual interaction with these elements were considered as mildly interactive. When players were asked during the focus group which elements they would add to improve game experience, several suggestions were made to interact with other groups (via chat) and to expand options and scores of sabotaging other teams. Furthermore suggestions were made to improve cooperation (extra tablet or sync with mobile devices).

Field test two results strengthened the positive game experience of sabotaging other teams as it was a recurrent topic of discussion in the focus group. In focus groups, teams addressed that city maps were not used during game play although a game element was changed so that pubs were removed from the tablet map and only shown on the physical city map in order to stimulate cooperation within teams. Traffic questions implemented in the game with the

purpose to stimulate cooperation and discussion resulted in mixed results; some teams negotiate and in other teams the tablet holder made decisions and proceeded without mentioning or providing team members with information. Some game testers addressed that the game was not that difficult and in another team the switching of tablet was a considerable issue, which influenced negative game experience on an individual level and resulted in minimal cooperation within the team.

In field test three, new game mechanics were integrated and introduced to game testers as to improve cooperation (and to a lesser extent competition, hence it was evaluated based on the previous field tests that this game dynamic was working to expectations in line with the expectations and goals of the game). Results showed that sabotaging was again one of the top positively received game mechanics. The role of a bodyguard was implemented to safeguard that the game was played in a safe manner; hence tablet usage can lead to a decrease in situational awareness due to attention shift. However, all game testers were confused on the extra roles implemented in the game, given the initial role of 'musician on tour' and traffic participant. Furthermore, go pro results obtained showed that although interaction during game play is obvious, game related cooperation was mild. As in previous field tests, the improvement in theory did not match expectations on cooperation improvement; decisions and strategy for game play were mainly discussed among two players who were directly into contact with the tablet. The other team member(s) were seldom involved and often not aware of their status in the game. Traffic questions were mostly discussed together which influenced cooperation positively and promo actions were received as positive.

A full analysis on the extensive audio and video data will be conducted as to evaluate how to optimize cooperation and competition considering the hourglass social framework in a location-based serious game.

References

Egenfeldt-Nielsen, S. (2006). Overview of research on the educational use of video games. *Digital kompetanse, 1*(3), 184-213.

Facer, K., Joiner, R., Stanton, D., Reid, J., Hull, R., & Kirk, D. (2004). Savannah: mobile gaming and learning?. *Journal of Computer Assisted Learning*, *20*(6), 399-409.

Huizenga, J., Admiraal, W., Akkerman, S., & Dam, G. T. (2009). Mobile game-based learning in secondary education: engagement, motivation and learning in a mobile city game. *Journal of Computer Assisted Learning*, *25*(4), 332-344.

Pagulayan, R. J., Keeker, K., Wixon, D., Romero, R. L., & Fuller, T. (2003). User-centered design in games. The human-computer interaction handbook: fundamentals, evolving technologies and emerging applications, 883-906.

Zagal, J. P., Nussbaum, M., & Rosas, R. (2000). A model to support the design of multiplayer games. *Presence: Teleoperators and Virtual Environments*, *9*(5), 448-462.