Using Online Games in Transport: Grr-Grr-Bike Case Study

Andrew Nash
GreenCityStreets.com
Bandgasse 21/15
1070 Vienna
Austria

andy@andynash.com
http://www.andynash.com

Telephone: +43 (676) 933-0483

Peter Purgathofer
Institute of Design and Assessment of Technology
Vienna University of Technology
purg@igw.tuwien.ac.at

Fares Kayali
Institute of Design and Assessment of Technology
Vienna University of Technology
fares@igw.tuwien.ac.at

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Abstract

This paper presents an introduction to using games in transportation. Many organizations are using online games to help explain complicated subjects, increase awareness and encourage participation, three key transportation agency objectives. The Grr-Grr-Bike game was developed to better understand how mobile games could be designed to achieve these objectives. In the game players swipe the screen to guide a bike rider along an increasingly more complicated streetscape while avoiding opening car doors and stopping at traffic lights. The game's objective was to encourage people to get involved in local bike planning and to teach them about urban cycling. The prototype game was released in January 2013 and then evaluated by game design experts. The experts produced a research report with improvement recommendations. The paper begins by providing an introduction to using games in transportation including example games, then uses the expert recommendations for Grr-Grr-Bike to illustrate important game design concepts, and finally presents general recommendations for using games in transportation.

USING ONLINE GAMES IN TRANSPORT: GRR-GRR-BIKE CASE STUDY

1. INTRODUCTION

Transportation agencies are making greater use of social tools in planning, building and operating services. [1] [2] [3] [4] [5] One type of social tool, online games, is being used by many businesses to attract, educate and involve people. Pure entertainment games such as Angry Birds have attracted hundreds of millions of users, but games have also been used to help improve the world and/or encourage social change.

The goal of this paper is to help readers better understand game design so they can use games more effectively. Section 2 introduces serious games and outlines possible transportation agency game objectives. Section 3 outlines six types of transport games and presents examples. Section 4 presents results of an expert evaluation of the Grr-Grr-Bike smart phone game to illustrate key considerations in game design. Section 5 presents conclusions and recommendations.

2. ONLINE GAMES FOR TRANSPORT PLANNING

2.1 Serious Games

Computer games are a controversial subject: are they destroying society or helping it? Answers range across the board, but evidence is growing that well-designed games can help identify good ideas, solve problems, educate players and motivate them to act in the real world. [6]

McGonigal has investigated computer games to identify why people play and how these qualities could be used to create games that help solve real problems. She finds that games provide a sense of urgent optimism (players need to do something and, while challenging, it's possible to be successful), provide a social fabric (people tend to like people better after playing games with them), they require users to work at challenging tasks (happiness research shows that people are happier when working hard than when just relaxing or hanging out), and that games provide epic meaning (akin to purpose in the real world). [7]

Reichart writes that transport agencies should be using games because that's where the people are. He reports that almost 60% of the U.S. population has a smartphone, over 100 million Americans use mobile apps, and that games are the most popular downloads. In other countries these numbers are even higher. Games are also good for organizing a community because people who play games together form strong relationships bonded through shared endeavors, goals, and practices. This increases their willingness to work with transport agencies. Finally, games can act as a platform for other web-based and real world advocacy tools such as crowd sourced mapping and problem identification, sharing technical information, GIS applications and more. [8]

2.2 Transportation Agency Game Objectives and Stakeholders

The first step in game design is identifying the objective. The objective helps determine the best type of game and specific game features. Since online games are quite trendy now it's worth emphasizing that games are not always the best way to achieve a given objective.

On the other hand, there are many ways transportation agencies could use games to help achieve their objectives. These include: communicating information, increasing interest, encouraging public participation, education, encouraging behavior change and building relationships.

Part of defining objectives is identifying the target audience or stakeholders. In other words determining "who" you want to inform, educate, encourage or influence. Some examples include:

- high school students who might want to join the transportation profession

- residents who might come to a public meeting,
- people who want to learn about a transport issue or how to use transport service,
- bicyclists who want to understand where cycling is possible in their communities, etc.

In short, transportation agencies need to identify specific objectives and target audiences based on their agency goals. Next they should ask whether a game is the best way to accomplish this objective for the particular audience. If the answer is "yes", then the agency can begin the game design process.

2.3 Gamification

This paper considers the use of games in transport planning. This is related to – but different from – gamification. According to Wikipedia, "gamification is the use of game thinking and game mechanics in non-game contexts to engage users in solving problems." [9]

An example of gamification is creating a reward scheme to encourage people to contribute useful comments on an agency website. Many popular applications use gamification to encourage participation including Waze (http://www.waze.com) and Moovit for public transport (http://m.moovitapp.com/). The rest of this paper focuses specifically on games, but many of the game concepts described can also be applied outside of games.

3. TRANSPORT PLANNING GAME TYPES

This section outlines six types of transportation games: information, driving simulation, planning, scenario, education and engagement games. There are four important points about this section:

First, many games are a blend of types. For example, they combine education with engagement.

Second, almost all transportation games include some education.

Third, online games are almost always integrated with social networking applications; the game is only part of the overall experience.

Finally, this list is not exhaustive. The games highlight best practices and creative ideas that help illustrate the potential of online games in transportation.

3.1 Information Games

Information games are designed to illustrate some basic fact. Budgeting games are a good example. In a budgeting game players are given a specific amount of money and asked to spend it. The idea is to show that there are limited resources and to illustrate how much activities or projects cost.

Budgeting games are very popular for transport agencies because many people have a very poor idea about how much transport projects cost. The San Francisco Country Transport Authority's Budget Czar game (http://www.sfbudgetczar.com/) is a good example.

Another example is the Portland Oregon Metro "Build-a-system-tool" shown in Figure 1. The website was a very early example of using online applications to help educate and inform the public about transport planning. [10]

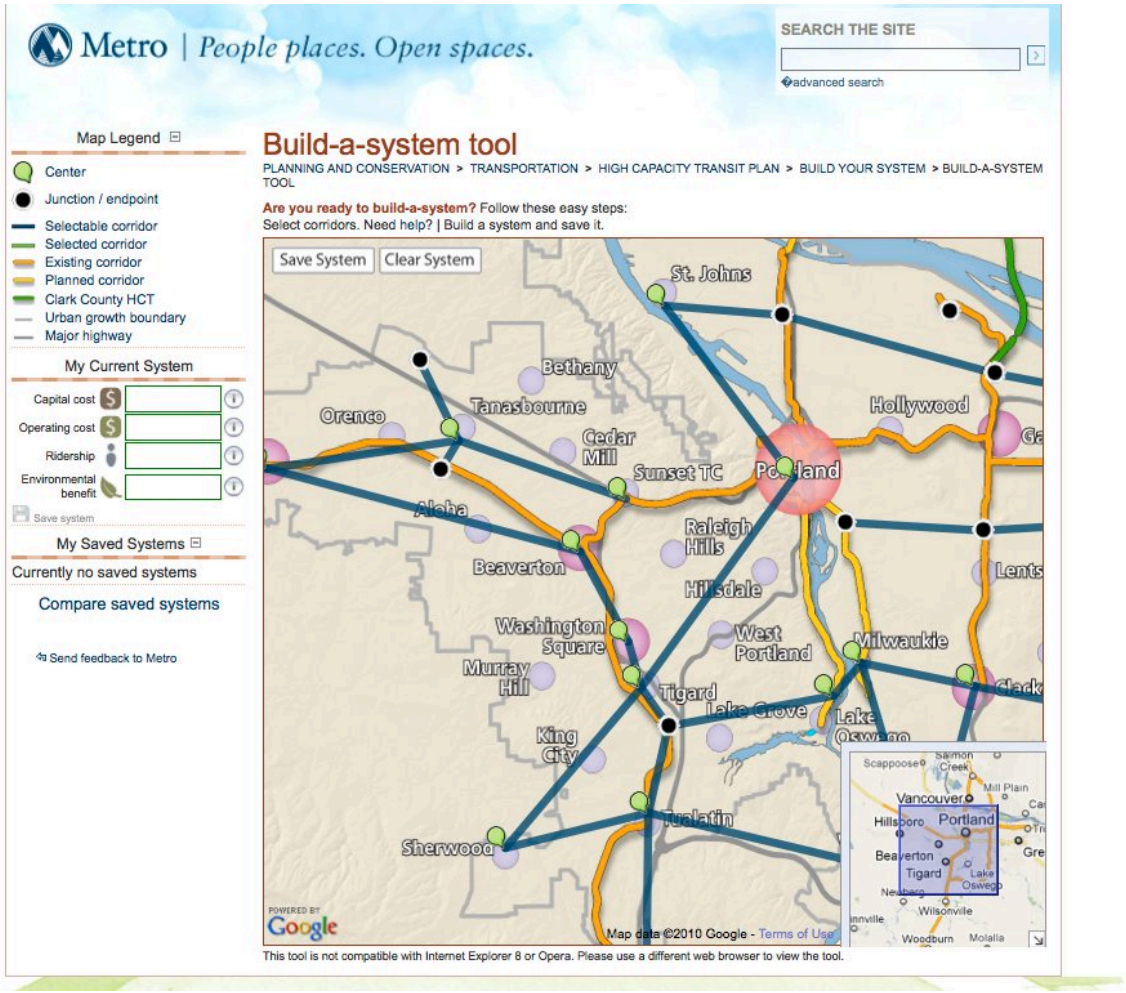

Figure 1: Metro: Build a system tool; Source: [10].

Portland's "Build-a-system-tool" and other budgeting games stretch the definition of game in the sense that they are not really "fun", but they still provide a much more engaging way of helping people understand the trade-offs involved in budgeting and transport planning. When used as part of more comprehensive social tools they can also become more game-like by including, e.g., contests to develop the most efficient services. Information games are a simple form of education game.

3.2 Driving Simulation Games

Driving simulation games are games where players control vehicles. There are simulator games for many different modes. One of the first and most famous was Microsoft's Flight Simulator. There are many bus and train simulators. An example is Bus Simulator 2010 (Figure 2).

Figure 2: screenshot from City Bus Simulator 2010; Source [11].

Simulator games are very popular, so it's interesting to consider how they could be used to help achieve a transportation agency's objectives. Ideas include educating people about the difficulties of driving, e.g., a bus, or helping increase public engagement. Both ideas illustrate how real games often blend the six game types outlined in this section.

3.3 Planning Games

Planning games are games where players design cities (including transport systems) and see how they perform over time. The most well known planning game is SimCity. The latest version of SimCity was released in March 2013 (Figure 3). It provides a very detailed level of simulation and allows players to compete against each other. The game is so detailed that some people have tried to use it to "diagnose their home town's traffic problems". [12]

SimCity, and other planning games, can also be considered to be educational games. In fact, SimCity's developer is creating a guide for using SimCity in school to help students better understand city planning and technology. [13]

The key problem with SimCity and other planning games is that it's very difficult to accurately simulate city development using highly specialized economic models much less in a game environment played on a personal computer. For example when Co.Exist organized a SimCity competition between six teams of urban planners none of the teams were able to create a truly sustainable city. In short, these types of planning games can help educate players about general concepts, but not detailed real world transport planning and operations. [14]

Figure 3: screenshot from SimCity 2013; Source [15].

3.4 Scenario Games

Scenario games are games where alternative worlds are created and players interact as if these worlds were real. World without oil is a scenario game that calls itself "a massively collaborative imagining of the first 32 weeks of a global oil crisis". (http://www.worldwithoutoil.org/). [16] The objective was to help players understand what would happen during an oil crisis. The game provided information to players via various Internet media (e.g. news reports, blogs, etc.) on what was happening in different places because of the shortage over the 32 week period. The players described what they "would" do under these conditions via social networks, blogs, videos, etc.

The interesting aspect of scenario games is that players can get very involved in their roles and often make changes to their real world behavior. For example, world without oil players reduced their oil consumption both during the game and afterwards. [7] While this example is only partly related to transportation, it illustrates how scenario games work and indicates how they might be used to help a transportation agency educate people or influence behavior change.

3.5 Education Games

Education games use game mechanics to help educate players. As described above, many types of transportation games include some degree of education. Transportation is a complex subject and there are many barriers preventing non professionals from getting involved (e.g., terminology, abbreviations, etc.). Developing a game forces designers to break-down information into simple, easy-to-understand packages, which is an ideal process for learning. This section describes four examples.

Bus Meister

BusMeister (Figure 4) is a fun way to learn about public transport operations. In BusMeister players add measures (e.g. bus lanes) to a generic street. They receive points for improving public transport user satisfaction, reducing costs and improving automobile user satisfaction (to help illustrate tradeoffs).

Figure 4: BusMeister Game Screen Shot (source: [17].

BusMeister has 12 levels starting from a very simple street where players only need to adjust bus stops to make customers happy, and ending with a very complex street where players can add many different measures and adjust bus operations settings to improve service (Figure 5). The game can be played on Facebook so players can share results and compete with each other or at: http://www.greencitystreets.com/busmeister.

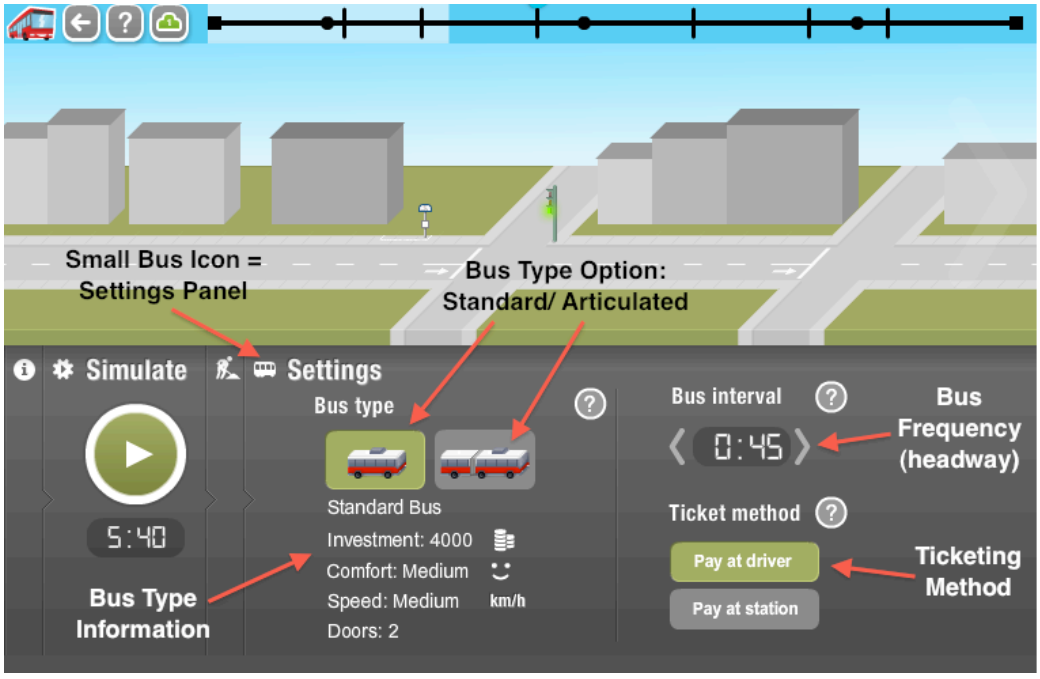

Figure 5: BusMeister bus settings options, annotated screenshot (source: [17].

BusMeister is part of GreenCityStreets (http://www.greencitystreets.com). The project includes a wiki with detailed educational information and a social network allowing people to make improvement suggestions to their local public transport operator (via Facebook).

The BusMeister game combines education and engagement. The game attracts people to learn about public transport operations and then encourages them to share improvement ideas via the GreenCityStreets social network.

Gridlock Buster

Gridlock Buster is a traffic control game developed by the Intelligent Transport Systems Institute at the University of Minnesota's Center for Transport Studies (http://www.its.umn.edu/GridlockBuster/). [18] In Gridlock Buster players control traffic and receive feedback based on vehicle delay and the length of queues formed at traffic signals. Players move through different levels of challenges and 'compete' to improve their scores.

Gridlock Buster is designed as a teaching tool to help explain how traffic is controlled on roadway networks. The website also encourages high school students to visit the ITS and learn more about transportation planning. This is another example of a game that combines education with engagement (i.e., encouraging young people to enter the profession).

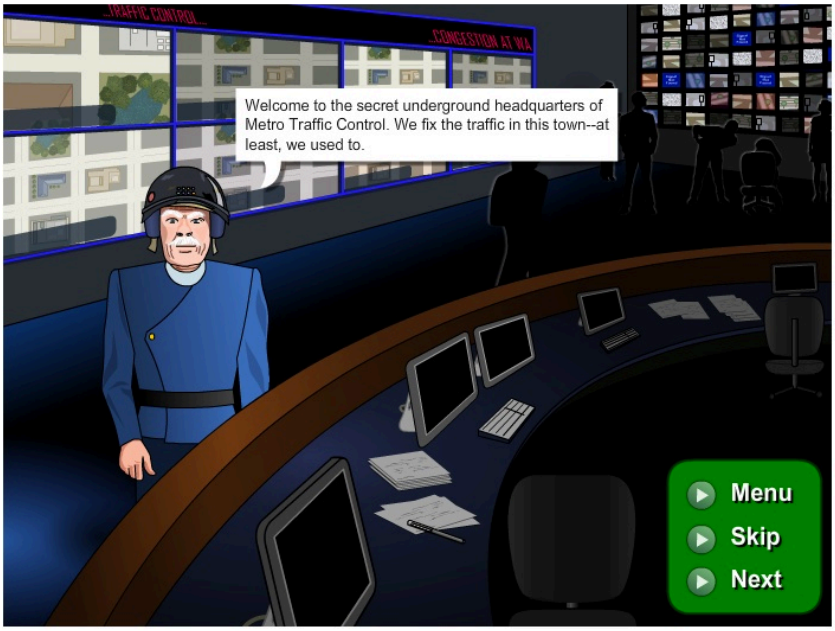

Figure 6: Gridlock Buster Game (source [18]).

MobiKids Vienna

The MobiKids project was designed to help children use public transport. The developers believe that if children learn to use public transport at an early age, they will be more likely to use it as they get older. The project included developing an online game called Mobikid (Figure 7). [19]

The Mobikid game helps young teenagers learn about Vienna's public transport system. Players register and enter an origin and destination address for trips they make on a regular basis, and then give the trip a name, e.g. "home to grandmother's house".

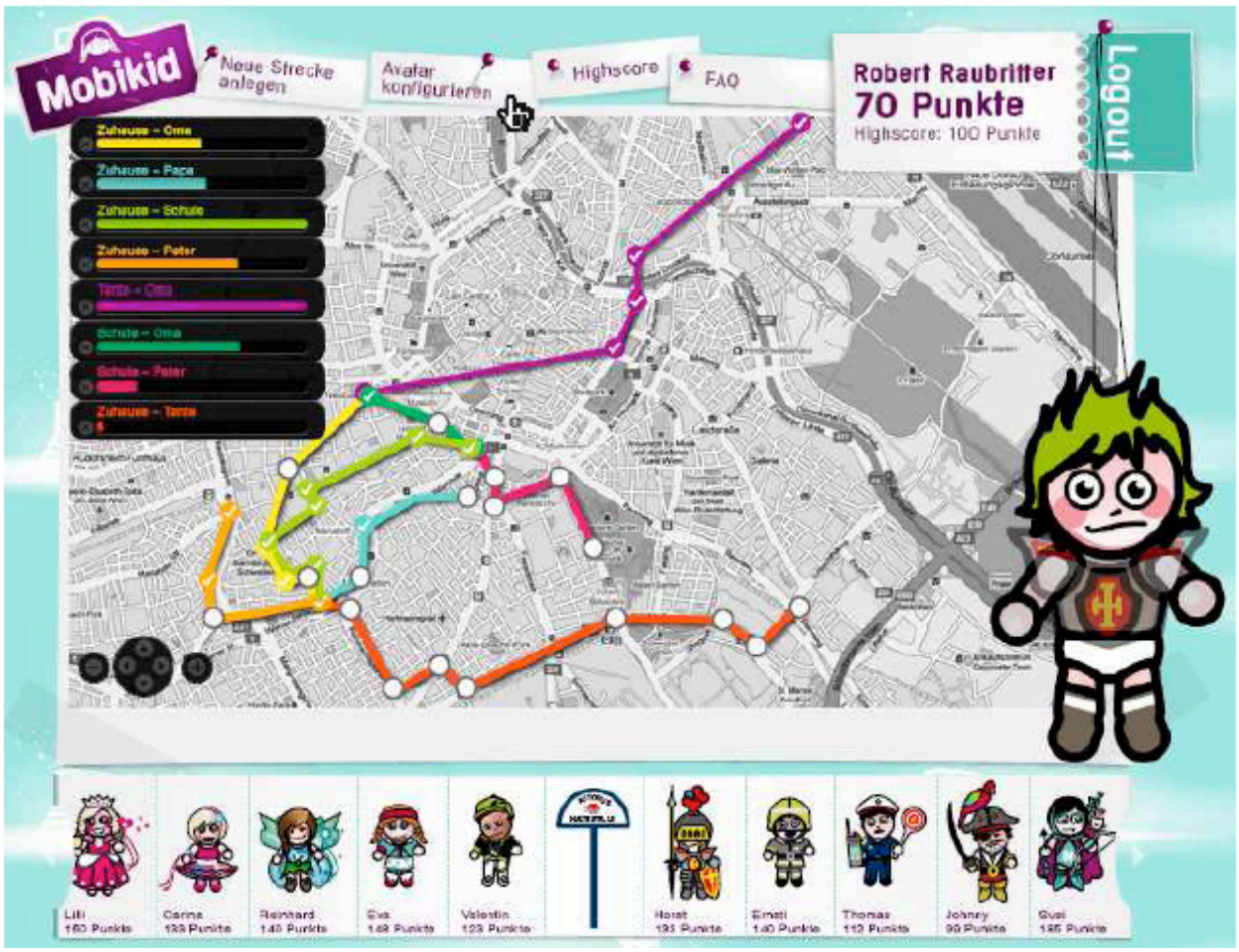

Figure 7: Screen shot from Mobikid computer game (source [19]).

Next, the game displays several public transport routes, just like a regular public transport information site, and asks the player to select one. Then the player needs to visit every station on the route to find a unique identification number. The player sends this ID number via SMS to the game site. Players receive points for each stop they visit. The goal is to visit all the stops on all your routes. Mobikid also combines education with engagement (encouraging teenagers to use public transport).

Meet the Street

Meet-the-street is a mobile phone game developed for the Swiss pedestrian advocacy organization Fussverkehr Schweiz by Feinheit Kreativ Studio in 2013 (http://www.meet-the-street.ch/en/). The game focuses on having players try to cross the street at different types of intersections with varying levels of traffic. [20]

The game presents several different scenarios and players control the speed of vehicles and pedestrians by touching or swiping over them to prevent collisions. The game includes quizzes on pedestrian safety that give players extra lives if they answer correctly. Figure 8 presents a screen shot from the game.

Figure 8: Screen shot from Meet-the-street mobile phone game (source [20]).

3.6 Engagement Games

Engagement is one of the most obvious objectives for a transportation agency game. Engagement games are designed to encourage people to do something, for example comment on a planning document or attend a public meeting.

Encouraging players to do something (besides playing the game) is an important part of many transportation games. However, some games are purely designed to engage players. They use a fun game to attract attention and then encourage players to perform some other activity. In addition to being specifically designed to attract people, well designed games leave players in a better mood after playing, helping make them more open to doing something compared to simply providing information.

Many businesses use pure engagement games to attract people to their website or sign-up for e-mail lists. One transportation agency contacted the author about using BusMeister in this way. An interesting example of a mostly engagement game but which also includes education is Chromaroma.

Chromaroma

Chromaroma is a game from London UK that shows players their movements through London's public transport system based on Oyster Card (smart card fare payment) data (http://www.chromaroma.com). The game was developed by Mudlark and is independent of any transportation agency. The game has competitive elements including allowing players to join teams and "capture" stations, completing "missions," or having players collect points based their miles travelled, etc. However, the developers also want to show players their "trails" though the city believing that these data will help connect players and build new types of communities. [21]

On one level Chromaroma helps educate players about London's public transport system (players are encouraged to visit more stations), but on another level the game is experimenting with using games to create communities, perhaps the ultimate form of engagement. A very simple example of where this could lead might be someone organizing the team that had "captured" a station to volunteer to pick-up litter at the station when they passed through.

4. CASE STUDY: GRR-GRR-BIKE GAME EXPERT EVALUATION

This section introduces readers to game design concepts by summarizing results of the Grr-Grr-Bike expert evaluation study. Understanding basic game design concepts will help readers in the process of working with game developers to create an attractive and effective transportation game.

4.1 Grr-Grr-Bike

Grr-Grr-Bike is a smart phone game designed to achieve two objectives: encouraging people to become involved in local bike planning and advocacy (engagement), and teaching people about urban biking (education). (http://www.grr-grr-bike.com) [22] The target audience is young people (ages 12-29) not involved in local bicycle advocacy activities. The game developers, Andrew Nash and Platogo Interactive Entertainment, also developed BusMeister.

Grr-Grr-Bike is an "endless runner" game, a quite popular game type that includes Temple Runner and Subway Surfer. In Grr-Grr-Bike the character is a postman on a bicycle being chased by a dog (Figure 9). Players swipe the screen to avoid obstacles including moving cars, parked cars and fixed objects. They also need to stop at traffic signals and avoid opening car doors. The game ends when players crash into an object, fail to stop at a traffic signal or get caught by the dog. Players swipe left or right to avoid obstacles, swipe down to stop at a traffic light and swipe up to "ring the bell" to avoid opening car doors. The goal is to go as far as possible and to collect the most bonus points (coins). A prototype version of Grr-Grr-Bike was completed in January 2013. The next stage of the project will be to improve the game and add it to the Apple App Store and Google Play.

Grr-Grr-Bike encourages people to get involved in local bike planning by providing a link for players to "learn how to improve biking in your community" on the results screen. The link takes players to a website with information about local events, activities and projects. This website would be very simple: one or two items with links for more information, and would be optimized for viewing on a mobile phone screen. The website information would be provided by transportation agencies and local groups via a template. Players would see different information each time they clicked and the information would be localized based on the smart phone's GPS and/or through player registration.

The game's secondary objective, education on safe bike riding, is accomplished by requiring players to stop at red lights and avoid opening car doors. The educational element is limited since are only three possible swipes: left-right, up or down. Left-right swipes must be used to avoid obstacles since that's the basic point of the game. This leaves two types of swipe for use communicating educational information. The developers chose stopping at red lights and avoiding opening car doors as the game's two educational elements because these are two main causes of cycling accidents. Also, the opening car door obstacle could help teach car users to look back before opening their door, in addition to reminding bikers to watch for opening doors.

Figure 9: Screen shots from Grr-Grr-Bike mobile phone game (source [22]).

The game design could be adjusted in many ways. For example a transportation agency might choose to educate players about other types of accidents (or change the educational elements over time). It would also be possible to include other types of gestures besides the three basic ones, although this would make the game more complicated to design and play, potentially reducing the fun factor. Another idea would be to add questions for bonus points (similar to the Meet-the-Street game). The evaluation recommendations presented below include many other ideas. Because of this great variety of options, many games (including Grr-Grr-Bike) are designed to be very simple initially but with the possibility of adding features if they are successful.

4.2 Technical Analysis Methodology

The Grr-Grr-Bike expert evaluation study was prepared by the Vienna University of Technology's Institute of Design and Assessment of Technology. The study objective was to identify improvements in usability and game design. Two methods were used to complete the study. First, 17 graduate level students in the seminar "Explorative Design" tested the game independently. Next they worked in groups of three to generate a list of game improvements and suggestions as a final course project.

Second, a focus group of local game design experts from industry was organized to critique and provide improvement suggestions. This focus group consisted of a guided discussion facilitated by the researchers and time for the experts to play the game. The results of these two processes were combined and analyzed by the authors in a research report.

The following sections summarize results of the research report. Each section summarizes a game design concept and illustrates this concept with example recommendations for Grr-Grr-Bike from the technical evaluation.

4.3 Game objective

The main finding from the expert evaluation was that Grr-Grr-Bike did not sufficiently achieve its main objective of encouraging players to become engaged in local bike planning. There were two main problems. First, the gameplay had inconsistencies due to trying to serve two objectives (engagement and education). Second, the game did not take advantage of potential opportunities for better integrating engagement into the gameplay. Both these are described below.

The expert evaluation recommended that the game developers begin by stepping-back and choosing a more focused goal for the game. Next they should revise the gameplay and consider better integrating engagement in the game. The evaluation posed the following questions:

- Does the game want to connect players to local bike advocacy groups?
- Does the game want to encourage players to cycle in the city, e.g. by showing cycling as a joyful activity?
- Does the game want to educate players about safe and proper cycling, e.g. by illustrating rules and dangers?
- Should the game tackle the emotional issue of bikers versus car drivers or steer clear of it?
- Does the game want to be an aesthetic and enjoyable experience in itself, or should the attraction only come from its theme, cycling?
- What is the game's target audience?

Answering these questions would help the game designers focus on one or two aspects that make the game a unique experience.

4.4 Gameplay

Gameplay includes four key elements: mechanics, dynamics, interaction and aesthetics. Here it is critical to emphasize that these four elements must be consistent with the overall game objective. Creating a game with mechanics that are inconsistent with the game objective makes it harder for the game to succeed. This was the problem identified with Grr-Grr-Bike. The recommendations presented in this section therefore must be considered in light of the game objective. More specifically, if a key game objective is educating players about safe cycling, then recommendations that might encourage unsafe cycling should be rejected.

Game Mechanics

Mechanics denote the operable parts of the game and thus the actions afforded to players. The Grr-Grr-Bike game provides quite restricted controls. While these controls are adequate, they could be improved to help the game better achieve its engagement and education goals by, for example:

- Making the bike freely moveable instead of using fixed lanes. This would provide a greater sense of agency and make the game more challenging.
- Adding more frequency and variety of contents/obstacles to make gameplay more challenging.
- Adding the ability to jump (since most runner games allow jumping, it’s almost an expected feature).
- Adding pedestrians and other bikers as obstacles to improve educational possibilities.
- Add some type of risk - reward balance. This means players taking higher risks get more rewards and at the same time face more difficult gameplay situations. A good example would be "near misses", where bonus coins are awarded for closely evading oncoming traffic.

Game Dynamics

Dynamics are the processes resulting from the game's mechanics. These processes should be directly related to the game experience. The research identified the following problems and ideas:

- The game should try to capture more of what makes cycling a joyful experience. For example focusing more on the flowing nature of cycling, meaning more steady speeds, wider elegant turns and flexibility in tight traffic situations.
- The dog is unnecessary. The dog and traffic lights very much contradict each other with the supposedly dangerous dog patiently waiting next to the bike at red lights.
- The need to stop at traffic lights directly conflicts with the conventions of the endless runner genre. Here the conflict between the game genre and the educational objective (i.e., teaching players to stop for traffic signals) is very clear. Possible alternatives include: ramps to jump over intersections, being able to cross while evading intersection traffic, adjusting speed to cross during a green phase without stopping.

Game Aesthetics

Aesthetic experience is the pleasure that results from sensory perception. Traditionally aesthetics refers only to visual aspects but experts are increasingly acknowledging the aesthetics of interaction, in other words the pleasures of well-designed ICT interfaces. These were always at the core of game design, but lacked a proper theory. Grr-Grr-Bike has several interaction aesthetics problems:

- The game does not reflect the aesthetics of cycling, neither visually nor in its interaction design. The characteristics of cycling that make it enjoyable are not present in the game. For example: the act of balancing, especially while cutting a corner, travelling smoothly in city traffic, the unity of motion and effort, or the way cyclists can be faster than everybody else, especially during rush hours.
- Circumstances that are challenging for real world cycling are not what makes the game challenging. Examples include road conditions, small obstacles like garbage or dog waste, and trying to ride hands-free.
- The game narrative does not work. Having the chasing dog stop at red lights breaks the story. Also the dog is not present in the game other than in the first few and the last few moments, making it hard for the player to keep the story in mind.

Game Interaction

Game interaction refers to how the players control action on the screen. Recommendations included:

- It should be possible to steer the bicycle by leaving the finger on the screen, dragging left and right without raising the finger from the screen. Optionally, steering could work via tilting the phone left and right, like in Doodle Jump.
- There should be a button for ringing the bell. Swiping up to ring the bell is not intuitive. Instead, the swipe up gesture could be used to perform some other maneuver, like briefly accelerating, jumping, or making a “wheelie”. Similarly, swiping down could be used to briefly decelerate. Both gestures could be used to avoid dangerous situations.
- All these actions (especially ringing the bell) would benefit enormously from immediate feedback, e.g. sound effects.
- The game does not allow players to pause and restart the game, a serious drawback for mobile games.

4.5 Long Term Motivation

A fundamental question for game sponsors is whether they want the game to be played once or played multiple times. In some cases it’s possible that playing once is appropriate, for example, when the game is designed to teach one specific topic. Here players go through a series of steps, learn the topic and don’t need to play again.

However, many sponsors want people to play the game multiple times, for example, when using games for engagement or to obtain feedback. In this case the game must be designed to encourage long term motivation. This can be done by giving the game a meta-structure designed to help bridge play sessions with interesting activities, providing specific incentives for returning to the game regularly and increasing game difficulty over time.

This last method is known as providing a well modeled learning curve. Gameplay should always be challenging while at the same time remaining accessible. This means that new items or features need to be carefully spread out. Game difficulty should always be a tick ahead of skills acquired by players. This prompts the trial and error player behavior and helps maintain game flow.

The objective of Grr-Grr-Bike is engagement and the developers want the game to be played multiple times. The expert evaluation recommended that the developers:

- Provide several game levels or have the game get harder as you play by adding new and more difficult elements (e.g. day and night change, left and right turns, pedestrians, cars that change lanes, and obstacles like trash cans, puddles and construction).
- Add more variety of landscapes and scenery.
- Add secret and alternate routes.
- Let players share results and add offline as well as online high score tables. Bike advocacy sites could also host local area high scores.
- Add "Ghost bikes" that let you follow a particularly successful run.

An especially good way to increase long term motivation is to include some type of currency that can be collected during play and then spent in later sessions. In Grr-Grr-Bike the coins only provide a second measure of success. Instead coins could be kept and used in future play sessions, for example to:

- Buy bike upgrades, including performance boosts (e.g. speed or durability) and visual improvements. The bell, which makes car drivers shut their doors, could also be an upgrade that has to be bought. These could especially appeal to real world bikers.
- Repair the bike from damage suffered in the previous play sessions. This assumes (a) a damage model, (b) damage carrying over from one play session to another and (c) damage leading to gameplay relevant effects (e.g. loss of speed).
- Buy upgrades for use in the next play session (e.g., faster bike, bike lane, helmet that lets you survive one fall).
- Give virtual money to virtual lobby groups for construction of, e.g., bike lanes, thus providing an in-game analogy to real world bike advocacy groups.

4.6 Using games for engagement

Grr-Grr-Bike's main objective was encouraging players to become involved with local organizations (e.g., transportation agencies or bike advocacy groups) to increase support for bike improvements. The evaluation found that Grr-Grr-Bike did not accomplish this objective very well because the only means for encouraging engagement is the link that appears on the results screen. Instead, encouraging engagement should be fully integrated into the game itself. Specific recommendations included:

- Create a "god mode", where all obstacles are removed for a limited time. This god mode would be "brought to you by" the sponsoring organization.
- Players could receive in-game goodies (e.g. coins, upgrades, new bikes) from the sponsoring organization.
- In-game people, identifiable as belonging to the sponsoring organization, could appear randomly to help players, e.g. by stopping cars and pedestrians, or working on bicycle lanes.
- Players could receive in-game help, e.g. in the form of new bicycle lanes, synchronized traffic signals, bike highways etc. "brought to you by" the sponsoring organization (see Figure 10).

The main recommendation is to more fully integrate the engagement element into the game.

Figure 10: Suggested design for improving long term motivation in Grr-Grr-Bike.

5. CONCLUSIONS AND RECOMMENDATIONS

Online and mobile games are extremely popular especially among young people. They represent an important component of social media strategies and are used by many innovative businesses to increase customer engagement, provide information and help inform planning.

This paper presented a framework for using games in transportation, summarized several types of transportation games, introduced game design concepts and developed a set of recommendations for using games in transportation. These recommendations are:

- Games should be used to help achieve organizational objectives. Games may not always be the best approach.
- The first step in game design is to clearly define the game objective and audience. It's possible to have multiple objectives, but this makes game design more difficult.
- Game mechanics should be closely linked to the game objective; games are less effective when mechanics are inconsistent with objectives.
- Games can be designed to be played once or multiple times depending on the specific objectives. Games intended to be played more than once need elements to increase long term motivation (e.g, credits that can be used in future games).
- Games need to be fun. Therefore it's important to use professional game designers. For both Grr-Grr-Bike and BusMeister, the game designers constantly challenged the transport planners to simplify complex ideas so that they could create realistic, but fun games.
- Use focus groups to evaluate gameplay and user experience, and then use this information to improve the game.

- Carefully consider technology choices. Make sure that the game can be played on a wide variety of platforms and can be maintained easily.

In summary, transportation games can be an important part of an organization's strategy. Games can attract users to agency websites, help agencies learn more about their clients, encourage clients to suggest improvements, and help foster positive relationships. Since games are also trendy, they can also help improve the image of transport agencies. However, as this research shows, games need to be carefully planned and designed to be successful.

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