SERIOUS GAMES IN A SOCIAL CONTEXT

Anton Eliëns

multimedia @ VU University Amsterdam

Creative Technology University of Twente

email: `eliens@cs.vu.nl`

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ABSTRACT

This paper reports about a newly developed course on serious gaming[1], with as a special focus behavioral change in a social or societal context. The purpose of this paper is to share our insights and references so that educational institutes may find inspiration to develop courses in *serious gaming* along this line. In the paper, we provide references to theoretical backgrounds, an overview of the structure and ingredients of the course, as well as a description of a game design workshop, with *civic order* as it's main theme, based on a case study of an actual problem area in the city of Amsterdam.

INTRODUCTION

Serious games are more and more considered to be an effective means to bring about awareness, acquire skills, change behavior, and influence social patterns.

Our students, perhaps even more than we (the lecturers) know what it is to adopt a gaming attitude to institutions, and perhaps even life itself, as eloquently phrased in a quote from McKenzie Wark (2007):

> ... ever get the feeling that life's a game with changing rules and no clear sides, one you are compelled to play, but cannot win. Welcome to gamespace. Gamespace is where and how we live today.

Motivated by the potential interest of students, as well as a growing recognition of the societal relevance of serious gaming, as illustrated by a recent report of the dutch foundation STT (Institute for the Future of Technology) entitled SERIOUS GAMING[2] (in dutch), and the activities of the applied research institute T-Xchange[3], which has as its mission: *serious gaming for innovation and change*, we developed a new course, *serious gaming*, with as its main theme: *serious games in a social context*.

With elementary game development technology, the students will explore the potential of serious games,

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[1] serious.eliens.net
[2] www.stt.nl/uploads/documents/219.pdf
[3] www.txchange.nl

using casual game mechanics, and what recently has been identified as the dynamics of gamification.

Games may in a general fashion be regarded as means to acquire skills and develop attitudes. The core mechanism of games consists of rules, with which the player interacts by so-called game-mechanics, actions that result in feedback on the player's performance. In such a way the player may develop habits, that lead to improved game playing over time. As observed in Juul (2010), casual games, which usually have a generally acceptable topic and simple mechanics are for *the player in all of us*, and to quote Flanagan (2009):

> games that depict everyday activities such as communication, social negotiation, caring for elements or characters that are part of a game world, or stabilizing precarious situations have become extremely popular with female players.

A distinguishing feature of serious games is, simply, that they are not meant for entertainment only, but that somehow learning, or awareness, occurs, in a particular domain, as exemplified by the topics listed below:

- awareness – world problems / social dilemma(s)
- education – language / mathematics / history
- health & well-being – skill(s) & remediation
- experience(s) – playful application(s)

Examples of serious games that may benefit individual health and well-being, and help to obtain skills as a remediattion for personal problems, include:

- team up – www.girlsinc.org/gc/page.php?id=6.2
- dangerous situation(s) – www.ditto.com.au
- communication method(s) – www.webwisekids.org
- muscle rehabilitation – on the move
- physical exercise(s) – www.silverfit.nl
- fitness – www.virtuagym.com
- overcome fear(s) – www.vrphobia.com

Such games will be more and more important in a society that becomes increasingly complex, stressfull and that imposes high demands on the endurance and stability of individuals, and may be regarded as a complement for serious games that address issues of cooperation and civic order.

The structure of this paper is as follows. We will start by looking at some basic considerations of serious games, and then discuss the theoretical background of serious games in somewhat more depth. After a more extensive description of the structure of the course, including the assignments, we will briefly introduce our *project utopia*, which asks the student for an explicit reflection on the norms and values of our society, underlying our behavior, followed by a brief characterization of a workshop game design, with *civic order* as its theme, based on a case study in the city of Amsterdam. We conclude with a reflection on the value of serious games in a social context, and more general remarks about the content and scope of the course.

BASIC CONSIDERATIONS

Our previous work on serious gaming includes ICT, Eliens & Chang (2007c), a masterclass game development, Eliens & Bhikharie (2006), creating a community of learners in SecondLife, Eliens et al. (2007a), the development of a climate game, Eliens et al. (2007b), learning chinese, Eliens (2010), how to present mathematics using game technology, Eliens & Ruttkay (2009). as well as a more theoretically oriented reflection on using replay to allow for learning from the actual game play by looking back, in a replay mode, at the actual choices made, Eliens & Ruttkay (2008).

The difference between ordinary games and serious games is, or should be, somewhat elusive, that is in terms of fun and entertainment there should not be (too) much difference, and as observed in Koster (2006), *fun in games* often consists of exploring the game space and slowly mastering the skills needed to deal with the challenges presented.

When serious gaming is applied for remedial purposes, in education or health care, or for effecting a change of civic order, as for example in controlling behavior in public spaces, we may regard serious games as (another form of) social technology, and ask the following questions:

- target(s) – which (group of) people?
- sponsor(s) – who initiates/pays?
- goal(s) – what behavior(s)/pattern(s)?
- instrument(s) – by what means/technology?

If we look at a specific category of serious games, as for example health games, we may observe that not only the player might be willing to pay, but also insurance companies or even the employers of the players, simply to assure better health at lower costs.

A common characteristic of many (health) games, is that they not only provide facilities for monitoring exercise and progress, but also offer essential social network support, to motivate the players/users to bring up the discipline to do the actual exercises. Being part of a community or social network has shown to be an effective instrument to encourage behavior, possibly in combination with rewards inspired by gamification dynamic(s), as discussed below.

awareness From the perspective of trans-individual problems, that is problems that concern our living space, our social community, environmental issues, and even world order, serious games that promote awareness are most relevant, with possibly as a result a more altruistic attitude towards sharing wealth, resources, even if only in the form of charitable donations.

As wellknown awareness games, we may mention:

- world hunger – www.food-force.com
- carabella goes to college – www.privacyactivism.org
- real lives – www.educationalsimulations.com/products.html
- refugee(s) – escape from woomera
- eye witness – www.mic.polyu.edu.hk/nanjing
- university politics – www.virtual-u.org
- sudan – www.darfurisdying.com

Apart from creating awareness by a more general audience, we may even ask, as pointed out in McGonigal (2007), how we can benefit from the cognitive effort(s), emotional energy and collective attention(s) of players, and more in general how we can deploy serious gaming to improve our world!

Awareness may well be a pre-condition for change. However, we live in a complex world, and actual change seems to require an adaptation of individual behavior, which may not be without cost, unless it is looked at from a different perspective.

THEORY BACKGROUND

There is a wide range of theory and scientifically interesting topics related to serious gaming, encompassing (not exclusively) the following subjects:

- psychology / behavioral economics
- complex adaptive (social) systems
- essential (economic) game theory
- gamification dynamics

Kahneman (2011) explains human irrationality in decision making as a result of using heuristic shortcuts, for example based on strong representations in memory due to priming and recency effects, and bias, which may result from *framing*, that is the way a question or dilemma is posed.

The limits of (human) rational decision making are also examined in Thaler and Sunstein (2008), but from a more political perspective. The authors introduce the notion of *liberal paternalism*, and examine the ways that decision making can be influenced by a proper

architecture of choice and, while retaining the freedom of choice implied by their liberal orientation, nudge(s), that is a push in *the right direction*, which of course is (always) a matter of perspective!

From (complex) systems theory, Axelrod & Cohen (1999), we learn that there are no easy solutions, and in particular, it is nowadays generally acknowledged that social networks and related mechanisms play an important, if not essential role, in the adoption of ideas and behaviors, Easley & Kleinberg (2010).

Finally, from Klein (2009) we learn that, even if we were able to think rationally about our behavior and decisions, once we are under pressure we might easily forgo our (good) intentions, and rely on our (wrong) habits. Whether rational or intuitive, the formation of the right habits may be considered to be a long process of building of expertise and experience, requiring a sufficient amount of awareness and self-discipline, McGonigal (2012).

essential (economic) game theory More than we perhaps may think, (economic) game theory may be used to analize our daily life, our domestic conflicts, issues of global war and peace, and (for example) meeting with strangers, Fisher (2008).

A typical (symmetric) payoff matrix for a two-person non-zero sum game, as used in game theory looks as follows:

A/B	cooperate	deflect
cooperate	R/R	S/T
deflect	T/S	P/P

where T = temptation, R = reward, P = punishment, S = sucker.

Symmetric in this context means that rewards and punishments are equal for both players.

The most well-known example is, no doubt, the prisoner's dilemma[4], for which $T>R>P>S$, giving a so-called Nash equilibrium for deflection, thus jeopardizing the mutual benefits that may result from cooperation, which is technically known as a Pareto equilibrium, Barash (2003).

It is interesting to note that there is a winning strategy for the prisoner's dilemma, that starts with a cooperative attitude, but is easily provoked into deflection, once the opponent appears to deflect. This strategy is aptly named *tit-for-tat*[5], Barash.

Another, less wellknown dilemma is called *chicken*:

A/B	cooperate	deflect
cooperate	live/live	coward/girl
deflect	girl/coward	dead/dead

The game has become (in)famous from the movie *rebel without a cause*, where two drivers approach a ravine, only to be called chicken when jumping first out of the

car, and obtaining the girl otherwise. For *chicken* the order of values is: $T>R>S>P$.

It may be observed that *chicken* is often played on the side-walks or in supermarkts, when meeting strangers, who is the first to go out of (y)our way? Chicken!

Tragically, cooperative behavior never seems to have a stable equilibrium, thus the default action, that is the action with the best payoff, always must be *deflection*. The dilemma between deflection and cooperation can even be more dramatically phrased as the choice of taking the risk to be a sucker or the courage to be a saint, Barash (2003). That this dilemma holds can be seen in the comparative values for the following games:

- prisoner(s) dilemma: $T>R>P>S$
- chicken: $T>R>S>P$
- leader: $T>S>R>P$
- free loader: $R>T>S>P$

The leader game is the familiar situation that you are both waiting to enter a door. Who is the first to go? If no one takes the initiative, there is a deadlock!

The freeloader game represents the behavior of a person that profits from the efforts or resources of a community, and is also known as the *tragedy of the commons*[6].

As an historical aside, both the prisoners dilemma and chicken played a prominent role during the cold war, and were actually developed (that is identified) by the RAND cooperation and deployed in their (serious!) war games, Levone et al. (1991).

Not all hope is lost, though, when we consider the evolutionary need for cooperation, that is, for our survival, Barash (2003). As the *tit-for-tat* prize-winning example indicated, playing games in succession is different from single, one-session, games. Moreover, as argued in Fisher (2008), apart from repetition, kinship and proximity lead to conditions of trust under which cooperation is likely to occur, although not necessarily! In our current day society, we must however more strongly impose cooperative behavior, by laws, by enforcing civic rules, and, more in general, reinforcement(s), Skinner (1971), that may well be understood as *operant conditioning*, that is by using punishments and rewards, not necessarily with as gentle an approach as *nudges*, Thaler and Sunstein (2008).

Serious games hold the promise of developing proper attitudes and habits, so that exercises in adequate behavior may be internalized by repetiton, and, with sufficient self-discipline, lead to what is called *transformative experience*(s) in martial art(s) and yoga, and why not travel, allowing us to become, indeed, better persons, McGonigal (2012).

gamification dynamics Reward systems may be considered to be the essence of the new trend of *gamification*, whether applied to areas of domestic or office

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[4]en.wikipedia.org/wiki/Prisoner's_dilemma
[5]ingrimayne.com/econ/IndividualGroup/TitForTat.html

[6]serious.eliens.net/dilemmas.html

quarrels[7], health[8], exercise and running[9] or practicing for MBA admission exams[10]. An interesting example is the gamification of public space using physical interaction, as explored by *the fun theory*[11]. As explained in Zicherman & Cunningham (2011), the primary goals of gamification are to build *engagement*, *loyalty* and *commitment*, using a proper system of rewards, such as: status, badges, experience points, etcetera. Tricks or mechanisms that may be used in gamification are, among others:

- appointment(s) – in which you must succeed / in time
- influence & status – achievement(s) / I want this!
- progression(s) – towards completion(s) / monitor(s)
- communal discovery – cooperation(s) / reward(s)

To be effective, however, such dynamics must be accompanied by or instrumented using proper rules and game mechanics, since (implicit) rules are usually a better way to modify behavior than words or visual decorations, or as observed in Bogost (2007), what we need, to bring about behavioral change, is *procedural rethoric*, that is *the art of persuasion through rule-based representations and interaction, rather than the spoken word.*

STRUCTURE OF THE COURSE

The course will take a multi-disciplinary approach, accommodating the variety in background and interests of the students, which may cover the range of game concept design, including social game dynamics, societal issues and game technology, including both programming, asset development and delivery and deployment issues. The course will cover two months of intensive work, of which the first month will be devoted to learning elementary game development techniques, and the second month to develop the serious game application, including an assessment of the (potential) effectiveness of the approach.
Apart from theoretical lectures, there will be regular workshops and presentation sessions in which the students present their work and get feedback.
A provisional schedule of the course looks as follows:

1. introduction(s) – the team & finding (y)our topic(s)
2. theoretical background(s) – narrative(s) & human(s)
3. miscellaneous – pitch / design(s) & gamification(s)
4. game design workshop(s) – express (y)our idea(s)
5. student presentation(s) – concept(s) & plan(s)
6. reflection(s) – ethical aspects of serious games
7. final presentation(s) – concept(s) & prototype(s)

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[7]www.chorewars.com
[8]healthmonth.com
[9]nikeplus.nike.com/plus
[10]www.beatthegmat.com
[11]www.thefuntheory.com

Students are required to work in teams of 2-4 people, with as a goal the actual development of a serious game, with social network support.

assignment(s) The assignments consist of basic exercises and a final project. As basic exercises we offer a theoretical task, to practice academic skills, as well as a practical task, to gain familiarity with the technology:

- project utopia – brief description of ideal society and potential role of serious games
- moodspace – exercise in visual rethorics, preferably in unity

Our choice for the unity3D[12] is motivated partly by our previous experiences as well as the availability of a free (indie) version for students.
Since we expect a wide variety of backgrounds with students following the course, we have formulated our final project assignments accordingly. Students must make a choice out of one of the following options:

1. prototype(s) – with sufficient documentation
2. concept design – with narrative(s) and visual design
3. trailer – promotion clip, with business plan
4. reflection(s) on societal impact – with sufficient depth

Options (1) and (2) are the recommended ones, (3) is viable only for business-oriented students and (4) is actually discouraged, unless the student has a strong theoretical background and interest.

benefits & pitfalls of the course: In summary, in the course as sketched above, students are expected to gain awareness of game design, become familiar with the practical use of game technology, game concept development, and practice communication and project planning, as well as cooperation in a multi-disciplinary team, and the delivery of oral and written reports.
A critical issue is the choice of suitable topics, which is preferably done with an external partner. A sufficient level of technical expertise is required, at least for a majority of students following the course. The structure of supervision should be such that creativity is stimulated, in order to maintain a high level of motivation.

PROJECT UTOPIA

What is an ideal society? And what role(s) can serious games play in the transformation of our society, and help accomplish improvements in, for example, environmental issues, education, health and civic order? For both creative technology students and students multimedia & game development it is worthwhile to reflect on such issues in a purely intellectual fashion,

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[12]unity3d.com

a craft too easily forgotton in our academic institutions, and give a brief description of their own ideas, in their own words, of the elements constituting a (potentially) ideal society, that we name, for convenience as well as historical reasons, utopia:

- environment(s) – facilitator(s), infrastructure ...
- system(s) – organization(s), incentive(s) ...
- rule(s) – code(s) of law, civic order ...
- (moral) value(s) – utility, behavior(s), ethic(s) ...

The need for a reflection on the (moral) values underlying our society, became even more clear to me after a year traveling in China, Clearly, as argumented in Sandel (2012), there is more to moral(s) than economic value only!

workshop game design – civic order(s)
Our workshop game design 2012 will have civic order as its main topic, and focus on means to establish citizen's participation in local neighborhood(s), with a case study of one of Amsterdam's city areas as a starting point. The case study and assignment(s) will be presented by a member of the Amsterdam city council. Following the structure of a game design workshop, as described in Eliens (2010), the assignments which must lead to a group presentation in less than one hour and a half are:

- (y)our player(s) ... ?
- what super power(s) ... ?
- invitation(s) – message(s) !
- (mini) game – mechanic(s) ?
- nudge(s) – re-enforcement(s) ... !?

The role of a superpower is here left somewhat ambiguous, since it may refer to a superpower to be acquired by the player (that is the target audience) or a superpower that is represented in the game by (artificial) opponents, Mark (2009).
When selecting (mini) game mechanics, the designers must keep in mind that, as indicated in Zicherman & Cunningham (2011), only a minority of the players consists of *killers* or *achievers*, and (in general) the vast majority participates for *socializing*. However, this division may be different for our target group(s)!

LET'S BE SERIOUS!

In one of my first papers on this topic, Eliens & Chang (2007c), I observed that – ICT is not a (simple) game. When speaking about civic order(s), a similar phrase might be either taken as an understatement or even as a warning, given the need expressed all over the world to guide and control (or nudge) the behavior of citizens, in urban areas as well areas threatened by the effects of consumerism, with as a dramatic example the rural areas of the country I recently visited, China,

where pollution due to production and consumption is a number one threat. I gained more insight in the China Dream[13] workshop, in which I participated at the end of my stay in China, the goal of which was *to reimagine prosperity and reshape consumerism in China ... (and) to catalyze a new aspirational lifestyle that is innately sustainable for the emergent middle class in China.*
Our question, as addressed in this paper, is how can we deploy serious games to counteract problems of personal health, order in public spaces, and in general civic behavior that leads to a sustainable society.
Following Bronowski (1956), what morals can science teach us? What is a community of learners, Eliens et al. (2007a), if not one in which truth and freedom of thought are values to be respected by everyone? During my travels[14], and back at home, I see people dump garbage on children's playgrounds, factories polluting the environment, people suffering from diseases due to contaminated food. Can science help serious games to change human behavior?
We may end by asking: why do people play games? According to Zicherman & Cunningham (2011) thst may be for reasons such as mastery (of a skill), to de-stress (from work life), simply for fun, or to socialize, with socializers a clear majority! And rephrasing the question from the perspective of game design, how can we design (serious) games that appeal to the people that play games and at the same time bring about changes both in awareness and (individual) behavior?

CONCLUSIONS

In this paper[15] we have reported on our efforts to set up a course on *serious gaming* that covers the various theoretical and practical areas related to serious games, including behavioral economics, complexity science, gamification dynamics and more general topics in (casual) game design.

As a distinguishing feature of serious games, we emphasize the moral aspect and the intention to bring about an enduring change of behavior, due to increased self-control, guidance and support by social networks using an adequate system of rewards and nudges, or encouragements, and, more in general, an awareness of the issues involved on both a personal and social level, creating the willingness to cooperate without fear of being regarded as a sucker, and preferably without the need or desire to be regarded as a saint.
Hopefully, our approach brings about some clarification with respect to the potential of serious games, if not to the reader, then at least to our students, which is, after all, our primary audience.

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[13]www.juccce.org/chinadream
[14]aeliens.wordpress.com/2012/02/10/minimalisms
[15]serious.eliens.net/paper-social.html

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BIOGRAPHY

Anton Eliëns (PhD) is lecturer and coordinator of multimedia @ VU University Amsterdam, and works at the University of Twente as professor creative technology / new media. He has experience in web-based interactive media, interactive video, game engines and the application of such technologies in serious games.