

# Serious Game Design Workshop

Casper Harteveld<sup>1,2</sup> and Rens van den Bergh<sup>2</sup>

<sup>1</sup> Department of Technology, Policy & Management  
Delft University of Technology, Delft, the Netherlands

`c.harteveld@tudelft.nl`

<sup>2</sup> Department of geo engineering  
Deltares Institute for Delta Technology, Delft, the Netherlands  
`{casper.harteveld,rens.vandenbergh}@deltares.nl`

**Abstract.** While human beings are very capable of designing everyday games, it becomes a different story if a more complex game needs to be thought of. The design process is especially complex for games that attempt to be meaningful about a particular aspect of reality. To give the needed experience and the specific knowledge and skills for designing these so-called serious games, the Serious Game Design Workshop was setup. During this hands-on workshop participants work on designing concepts and not on the technology or aesthetics. To structure the workshop and to enable participants to get experience with a certain technique or approach, the workshop makes use of the Triadic Game Design approach.

## 1 Introduction

Creating and playing games is inherently human [1]. On a boring Sunday afternoon with friends and family this may evidently appear. Spontaneously, people think of a game together, such as a “what-if” quiz game. It could also appear in any other daily activity. If a couple can opt to take an escalator or the stairs, they could make this endeavor into a game if one takes the stairs, while the other takes the escalator to see who gets to the top first. Even in games that are recognized as such people change the rules to make a game more interesting or less frustrating. Without knowing this consciously, humans are very capable of designing games that are fun and apply this skill more often than they realize.

Of course, some people are more skilled in this particular activity than others. They may either be more playful, more creative or both. Something that without doubt is influential as well is experience: experience in playing but especially in designing games. The role of experience has been emphasized in various literature [2, 3] and is one of the reasons why workshops exist. Workshops give participants the ability to get into touch with a subject, but more importantly, also enable them to get hands-on experience with the subject.

Another reason why workshops are employed is that specific knowledge and skills are needed for improved performance or for performing at all. Related to games, several scholars [4, 5] argued that game design is an art, science, a craft, or

any combination of the three. As designing games can be described as applying a set of fundamentals (or patterns [6]) in a creative effort to construct an artifact for which specific knowledge and skills are required, it could in our opinion be seen as an art, science, and craft all at once. Nevertheless, the extent to which each matters may differ depending on the type of game and its purpose. The point to be made is however not to explicate what game design is, but rather to show that mastery and understanding is needed of game design techniques and approaches. Whether something is an art, science or a craft, each way of doing requires a technique or approach.

This need for mastery and understanding becomes clear when a game design is wanted that goes beyond the everyday games that people play, such as “quiz” and “who is faster” type of games. Although people may indeed be capable of instantly creating everyday games, they cannot be expected to develop complex board games as *Settlers of Catan*. For this reason, many game workshops have been put into practice over the years and as game studies start to get more feet on the ground in academia, game design courses at universities are emerging as well. Even a book with the significant title “Game Design Workshop” was published [7], outside an increasing number of books about game design. This shows a need for a theoretical as well as practical study of game design in general.

But what if we want to design an even more complex game? For instance, a game in which players really have to learn something, something about the climate, history, or quantum physics. Not only does such a game need to be fun, it needs to be educating and valid as well. This makes the task of designing much more difficult. Instead of having the freedom to find the optimal solution to a single problem set, a solution has to be found for multiple problem sets. Finding an optimal solution for the latter is more challenging. This means that “serious games”, games with a non-entertainment purpose [8], are more complex to design, although the games themselves may from the outset look less complex in terms of gameplay and gameworld compared to any big digital game.

Moreover, to solve the multiple problem set designers cannot rely on the same specific knowledge and skills that are needed for designing entertainment games. They need to understand the subject matter at hand, how people learn and perceive their world around them, and how these two aspects can be effectively integrated in a game environment. This requires an inter-disciplinary focus, in which the designer draws upon many lenses. To achieve this focus the “Serious Game Design Workshop” was setup. This workshop goes beyond thinking of everyday games and the average game design workshop as it draws upon a broader range of perspectives that are needed to create a successful serious game. This paper describes the theoretical background, the purpose and functionality, and the implementation of this workshop.

## 2 Triadic Game Design

The idea of serious games is contrary to what many believe not new. It first appeared as a concept in a book in 1970 [9]. Although it may have appeared

back then, the application of games for non-entertainment is as old as human kind itself [1]. Despite the extensive application, the first publications about game design did not appear until the early 70's [10]. In our own research, we experienced that serious game design is about three core elements that need to be balanced against each other [11]. This approach, and it has to be emphasized that it is merely one way of looking, is labeled as "Triadic Game Design". The core elements are similar to the primary colors of red, blue, and yellow and need to be mixed appropriately to get the right blend of fun, learning, and validity. This approach and the techniques related to it are at core of the Serious Game Design Workshop.

Before explaining the approach into more detail, it is necessary to define our idea of game design. Designing games, in particular digital ones, requires the consideration of a variety of aspects, like the aesthetics and the technology. When speaking of game design we do not consider these aspects. Rather, what is important to us are the "concepts" of the game. These are somewhat abstract notions of what the rules of the game are, how these rules establish a meaningful message, and how they are related to reality.

From the concepts specific instances can be created, like scenarios or story lines. Although these are relevant, the focus of the workshop remains (necessarily) limited to the concepts. This has some implications for the eventual results of the workshop, as concepts are normally tested and reiterated after implementing them. This means that the concepts that participants designed during the workshop may effectively turn out to be not successful. However, the point of the workshop is not to design successful concepts, but to achieve insights in a way of thinking and doing.

This way of thinking and doing is centered on the idea of Triadic Game Design. The three core elements are referred to as *ludus*, *semiosis*, and *ontology*. The core elements are not only affiliated with specific game elements, they also represent a way of looking, a "Weltanschauung", onto designing games. *Ludus* for instance, Latin for play or game, relates to all the elements that are concerned with playing, from power-ups to scores, and relates to the fields of human-computer interaction to creative writing. Basically, these are the same elements and fields for designing entertainment games.

The second core element, *semiosis* [12], refers to the production of meaning. Distinguishable from entertainment games, serious games have some meaning, whether physical as in most health related games, theoretical as in most educational oriented games, or practical as in most games used for training. Related elements are not necessarily pop-ups with texts. Meaning can and should be embedded in game interactions. Examples of fields are media studies, the learning sciences, and semiotics.

Finally, the third component is ontology. With this a conception of reality is referred to. Every game consists of a model of reality, even entertainment games. These models are biased or subjective next to being incomplete, as people have different perspectives on reality and it is impossible to simulate reality perfectly. The related elements are those that represent a part of reality. The fields are

those that are connected to the subject. If it is a game about logistics, a field like supply chain management is involved.

To create a successful serious game each core element is equally important. This differs from entertainment game design. There only ludus matters. Unfortunately, considering each element equally is easier said than done. Aside from the huge amount of perspectives that need to be taken into account, it turns out that at some points the elements may not be complementary to each other, but conflicting [11]. For this reason, designers need to make trade-offs between the elements. The idea of the workshop is to not only let participants see what the core elements are and how they need to be considered, but also to let them experience how these trade-offs appear during the design process.

### 3 Purpose and Functionality

Essentially, the workshop uses the idea of Triadic Game Design as an approach to design serious games. However, the workshop is not a transfer of this way of thinking and doing. Discussion and critique are fundamental to the workshop. Especially, since the idea of Triadic Game Design is just that, an idea, and as such, it may not apply to all situations. The approach is used as a frame onto which more elaborate thoughts about serious game design can prosper. Without anything to hold on to, especially if participants are completely new to the practice of game design, it becomes difficult to get started and to be able to think about serious game design. Hence, the purpose of the workshop is to give participants a better sense of designing serious game concepts by using the Triadic Game Design approach, not by teaching them this approach.

This purpose is achieved according to a learning-by-doing style that fits the power of games: by letting participants experience by trial-and-error how to accomplish a solid concept. This means little instruction is given by the facilitators. The participants simply get an assignment and immediately start working in groups. The facilitators guide them during this process and hand out a design template. The template points out what participants need to consider for each assignment. Plenty of time and space is dedicated for discussion after each assignment, since the reflection that takes place during the discussions should give the necessary insights into serious game design that participants could use in practice.

The workshop format to achieve this goal is flexible and could be applied in different settings. It could be used to get people acquainted with serious game design in general or be adapted to help people in getting some ideas with developing a specific serious game. For the latter, the workshop is more or less used as a “brainstorming tool”. This has for example been done at the U Game U Learn conference. Participants were working in this case on concepts for developing a serious game related to libraries. Although half day workshops have been given, it is in our opinion better to take a full day as this gives more opportunity for discussion and also enables the facilitators to draw upon more theories during the discussions.

## 4 Implementation

The current setup involves one ice-breaker and four assignments that participants have to work on in groups of three to four participants. The ice-breaker consists of a construction problem, in which participants have to build a stable construction with three spoons on top of three coffee cups that cannot be moved. Each spoon represents a core element. The solution is to find the right balance while using the three spoons. This assignment represents thus metaphorically the idea of Triadic Game Design. At first this task seems impossible, but participants quickly engage into trial-and-error solution finding and come up with some ideas. This will not necessarily lead to a solution. From experience we have seen that many groups did not reach a solution at all, while other groups get it right away.

The first real assignment focuses on the ludus element. Groups have to grab a theme that is common to most entertainment games and are assigned to design a triple A game based on this theme. It needs to be a million dollar block buster, similar to *Grand Theft Auto IV*. The goal of this exercise is to become acquainted with developing a game that is fun. In previous runs of the workshop we noticed that participants get the wildest ideas, but have a problem to actually explain how this would work out gameplay wise. For this assignment, we also encourage participants “to think differently”. Many entertainment games are alike, and to stand out from the competition, the game concept has to be unique.

The second assignment involves semiosis. This time groups have to take one game from a pile of existing entertainment games and change it in such a way to make the experience more meaningful. They have to think of a specific message (more than one is possible too) and show conceptually how players would pick up this message while playing the game. To achieve this, it may be necessary to alter a number of the core mechanics of the original game. Additionally, they have to explain how the game would be applied in practice. In previous runs of the workshop we observed that groups come up with completely different concepts, ranging from contextual information to emerging gameplay elements. The goal of this exercise is to design a meaningful game experience.

The exercise related to ontology is about identifying the model of reality behind a game. This is different from the conceptual model of the game. The latter involves gameplay elements, while for this exercise groups only have to explain the factors and their relationships of the reality components without actually thinking of how this would be translated into a game. Basically, this exercise is about defining the problem. Groups first have to choose a certain serious subject, like starvation, amongst a number of other possibilities. As these subjects are quite broad they need to be further specified into what groups will consider for eventually implementing a game. The goal of the third assignment is thus to come up with a valid model of reality.

The final assignment draws upon the previous ones. In each assignment groups used certain principles or ideas. These are identified and elaborated upon during the discussions after the assignment. For this last assignment their task is to combine all these previously used principles and ideas to create a successful serious game. As it may turn out, some of the principles may be hard to fit in.

If this is true, groups may neglect these. The goal of this exercise is to experience how the three core elements complement and at the same time clash with each other. At the end of this fourth assignment, groups present their complete concept. Subsequently, the workshop is brought to an end with some concluding remarks by the facilitators and by a quick evaluation of the workshop itself.

## 5 Conclusion

The Serious Game Design Workshop is an example of a workshop that attempts to give participants experience as well as specific knowledge skills about serious game design. Next to this, it can be used as a brainstorming tool for getting a variety of ideas. The workshop is focused on designing concepts and not on the aesthetics or technology. To provide some structure and to let participants experience a certain technique or approach, theoretically the workshop makes use of the Triadic Game Design approach. This approach entails that serious game design consist of dealing with three core elements, ludus, semiosis, and ontology, who are equally important and need to be balanced against each other to create a successful serious game. Although serious game design workshops in general could differ enormously from this setup, this workshop does indicate that it can be fruitful for participants to engage in a workshop like this. Like one of the former participants put it: “I have learned more in one day than during my game design course that lasted for one complete semester.”

## References

1. Huizinga, J.: *Homo Ludens: A study of the play-element in culture*. Beacon Press, Boston, MA (1938/1954)
2. Dewey, J.: *Experience and education*. Collier Books, New York, NY (1938/1963)
3. Kolb, D.A.: *Experiential learning: Experience as the source of learning and development*. Prentice Hall, Englewood Cliffs, NJ (1984)
4. Adams, E., Rollings, A.: *Fundamentals of game design*. Prentice Hall, Upper Saddle River, NJ (2006)
5. Crawford, C.: *The art of computer game design*. McGraw Hill, Berkeley, CA (1982)
6. Björk, S., Holopainen, J.: *Patterns in game design*. Charles River Media, Hingham, MA (2004).
7. Fullerton, T., Swain, C., Hoffman, S.: *Game Design Workshop: Designing, prototyping, and playtesting games*. CMP Books, Berkeley, CA (2004)
8. Bergeron, B.P. *Developing serious games*. Charles River Media, Hingham, MA (2006)
9. Abt, C.C.: *Serious Games: The art and science of games that simulate life*. Viking Press, New York, NY (1970)
10. Duke, R.D.: *Gaming: the future’s language*. Sage Publications, New York, NY (1974)
11. Harteveld, C., Guimarães, R., Mayer, I., Bidarra, R.: *Balancing pedagogy, game and reality: The design philosophy of LEVEE PATROLLER*. (forthcoming)
12. Bains, P.: *The primacy of semiosis: An ontology of relations*. University of Toronto Press, Toronto, ON (2006)