

# [A serious games overview education essay](https://assignbuster.com/a-serious-games-overview-education-essay/)

Computer and video games are normally known understood as a form of entertainment. However, surprisingly and rapidly they are becoming recognized as providing a powerful means for learning “ and being called Serious Games”, both among educators and the game development community. A lot of research is being conducted to explore Serious Games possibilities. This paper investigates the notion of games as means for learning/training “ Serious Games”, will look to the available definitions, investigate its relations with other terms and categories “ Entertainment/ Learning /Gamification” show its applicability, limitations and lastly we will suggest future studies to be conducted about it.

## Introduction:

Today’s “ serious games” is a big and serious business; the serious game sector is expected to grow significantly in the medium term. In 7th of July 2010 – IDATE (market analysis and consulting firm) released its “ Serious Games” market report where is estimated that serious games in 2010 generated 1. 5 billion EUR in revenue around the globe, and that by 2015 sales will be almost seven times what they are in 2010 – with an average annual growth rate of 47% between 2010 and 2015. [1]

A key question, when discussing serious games, is what the concept itself actually means. Even a brief survey of the literature soon reveals that there seems to be as many definitions available as there are actors involved, but most agree on a core meaning that serious games are (digital) games used for purposes other than mere entertainment.

Another question of interest concerns the claimed positive effects of such games, or of applications from related and sometimes overlapping areas Entertainment, Learning and Gamification. In addition to obvious advantages, like allowing learners to experience situations that are impossible in the real world for reasons of safety, cost, time, etc. (Corti, 2006 [2]; Squire & Jenkins, 2003 [3]). However, it is not the case that all games are good for all learning outcomes (van Eck, 2006 [4]). The aim of this paper is to take a closer look at some aspects of these issues.

A lot of emphasis is putted into gaming, gaming types, gaming advantages and disadvantages. There been many studies about it, as people looking to it as the new innovative way that may enhance our life.

We will start our research by defining Games in general to subset from it Serious games, then explore SG definitions, explore SG relation with Entertainment games, Learning and Gamification. After that we will look to SG attributes, applicability, limitations to finally suggest some potential research area.

An overview of Games:

This paper focuses on the domain of serious games and since SG is a subset of games we will take first a look at Game definition to conclude from their a start point for our research.

“ A game is a system in which players engage in an abstract challenge, defined by rules, interactivity, and feedback, that results in a quantifiable outcome often eliciting an emotional reaction.” By Koster is his seminal work “ A Theory of Fun” [5]

According to Caillois play and games fall on a continuum between what he terms ludus, rule bound games and paidia, anarchic playing, therefore we need first to differentiate between game and play. Whereas the word “ play” is used for games as well as for toys, there is a difference. Following Caillois’ concept in his book “ Man, Play and Games (2001)”[6] we can light on the difference, Caillois describes paidia and ludus as two poles of play activities. Where paidia (playing) describes free-form, expressive, improvisational behaviors and meanings, ludus (gaming), on the other side, characterizes rule-based playing with determined goals.

In matter of serious games we are talking about “ ludus” with a context of having a purpose behind playing the game. So we can define play as it is less the opposite of seriousness than the vital ground of spirit as nature, a form of restraint and freedom at one and the same time. (Gadamer, 1986) [7]

## The Concept of Serious Games:

The term “ serious game” is not new; the first time term was introduced by Clark Abt who discussed the term in his “ Serious Games” book in 1970. [8]

Serious games usually refer to games used for training, advertising, simulation, or education that are designed to run on personal computers or video game consoles. However searching the web, a number of different definitions are available, such as:

“ Games that do not have entertainment, enjoyment, or fun as their primary purpose” (Michael & Chen, 2006, p. 21) [9]

“ The use of computer game and simulation approaches and/or technologies for primarily non entertainment purposes” by (PIXELearning. com, 2006) [10]

Game-based learning/serious games “ is all about leveraging the power of computer games to captivate and engage end-users for a specific purpose, such as to develop new knowledge and skills”. According to Corti (2006, p. 1) [2]

“ Serious game is a mental contest, played with a computer in accordance with specific rules, that uses entertainment to further government or corporate training, education, health, public policy, and strategic communication objectives.” by Zyda’s (2005, p. 26) [11]

When comparing serious games with just computer games, Zyda argues that serious games have more than just story, art, and software. It is the addition of pedagogy (activities that educate or instruct, thereby imparting knowledge or skill) that makes games serious. However, he also stresses that pedagogy must be subordinate to story and that the entertainment component comes first. [11]

Some consider fun the prime factor in games and education and, according to Prensky (2001) [12], games should be fun first and then should encourage learning. Similarly, Michael and Chen (2006) [9] argue, with regard to serious games, that the main point is to get players to learn something, and, if possible, have fun doing it.

“ Fun”, however, is neither the only form of entertainment, nor the only way to engage players in a game. Besides fun, there are several elements that contribute to players’ engagement. According to Corti (2006) [2], the motivational virtues of video games are what initially attract training and development professionals to turn to game-based approaches, but there is a lot more to game based learning/serious games than simply using fun as a means to engage learners.

## Related Concepts to serious Games:

There are related and sometimes overlapping domains to Serious Games (Entertainment, Learning and Gamification) which we need to distinguish their relativity to Serious Games.

## Serious Gaming vs. Entertainment Gaming:

An adequate question to ask is how serious games differ from entertainment games. The below table compare Serious Games and Entertainment Games from Michael and Chen (2006) [9] view points where they discuss it from a design and development perspective following four criteria to compare “ Task/Experience, Focus, Simulations and Communication”

## Serious games

## Entertainment games

## Task vs. rich

## Experience

Problem solving in focus

Rich experiences preferred

## Focus

Important elements of

learning,

To have fun

## Simulations

Assumptions necessary

for workable simulations

Simplified simulation

Processes

## Communication

Should reflect natural

(i. e., non-perfect)

Communication

Communication is often

Perfect

The differences between entertainment games and serious games -Table 1

For serious games it is more important for the players that the model or simulation can be used to solve a problem, than providing “ rich experiences” of the kind sought by hardcore gamers. Further, for serious games it is essential that the most important elements of learning are in focus and that the assumptions necessary for making a simulation workable are correct, which if not; the simulation will teach the wrong kinds of skills. Entertainment games, on the other hand, allow players to focus on the fun parts and to use a number of techniques for simplifying the simulation processes. In serious games, Michael and Chen (2006) [9] argue, it may be important to rethink the use of such simplifying techniques. For example, serious games should respond more to the conscious decisions made by players than to chance, and therefore randomness may be inappropriate. Another example is communication, which often is perfect (i. e., without delays and misunderstandings, etc.) in entertainment games, whereas some serious training applications should rather reflect that communication hardly perfect.

As with simulations and serious games, the distinction between entertainment games and serious games is not very clear either. It is evident that it is the goal of the first to entertain, and of the latter to educate/train/inform the player. However in some situations entertainment games are used for serious purposes as well. In addition to that serious game designers, researches argue that fun can be a crucial element to motivate a player to continue playing a serious game.

## SG and Learning:

The recognition and adoption of games as learning technologies has helped educators in utilizing games as a means for providing serious learning opportunities for players.

With games understood as learning technologies, the question arises as to what’s different about the learning when games compared to that typically within schools.

One of the more obvious differences resides with the control afforded to the learner as player, where the state of control is typically afforded to players in games and teachers in schools. Games, therefore, present a “ learner-centered” approach to learning, whereas traditional education presents a “ teacher-centered” approach.

The other different is that in games it is up to players to construct for themselves, their own knowledge, whereas in the latter, it is up to teachers to transfer knowledge to the learner. So the two processes of teaching and learning can be argued as quite different. Learning can be understood as a process whereby learners active construct knowledge through experience and interaction, whereas teaching traditionally is a process by which teachers distribute knowledge to learners through transmission

The design of serious games “ games with a focus on education” should be about creating meaningful experiences and activities for players, rather than a means for ‘ transmitting’ knowledge from the game to the player

Serious Games and Gamification:

Serious games and gamification are both trying to solve a problem, motivate people, and promote learning using game-based thinking and techniques.

Serious games tend to take the approach of using a game within a well-defined game space, while gamification tends to take the use of a game outside of a defined space and apply the concept to items like walking up steps “ piano stairs”.

So we can say that serious games are created by using game-based mechanics, philosophy, and game thinking to engage people, motivate action, promote learning, and solve problems. In other words, they are created through the gamification of traditional learning content. [8, 11, 13]

Serious Games Attributes:

Now after defining serious game and discuss it, in relation to other related concept, we need to highlight some of the common game attributes that must be taken in consideration when developing it . These are some suggested attributes by Anne Derryberry [14]:

Back-story and story line: Every game has a story upon which it is based, and a story line that it follows, even if inferred. The story line is not the game play itself, but rather the rationale for the game play.

Game mechanics: These handle all the specific functions within a game, including such things as how the game’s physical world behaves; in-game weather; and the actions a character takes when given a command.

Rules: The corollary to game mechanics are the rules of the game , the constraints in game play that exist on every player’s actions and abilities

Immersive graphical environment: This is the sensory representation of the experience layer of the game, including 2D/3D graphics, sound, and animation. This environment can be static (it resets at the end of each player session) or persistent (it continues to evolve even when a player isn’t logged in).

Interactivity: This focuses on the impact a player’s actions have on the world and includes issues of persistence and player interaction

Challenge/competition: This is at the heart of any game. The competition might be against the game, against one’s self, or against other players.

Risks and consequences: These must attend every challenge, but they exist in the safe game environment where the consequences of an action or decision do not impact the real world.

## Serious Games Advantages:

The idea of using games for work and in workplace generates a lot of excitement and appeal to both employer and employees. This excitement is a result of the advantages games. Some of this advantageous are as follows [15]:

Engagement: Games are compelling and maybe addictive and the engagement it produces is hard to match with other training methods.

Games feel “ safe”: Games provide a safe place to practice, where learners know they will not be penalized for their mistakes. Playing games can be a safe place to try different approaches, to experiment, and to make mistakes and to fail.

Reduce Cost and Complexity of training: The cost of developing game is usually lower than cost of other types of training.

Get direct feedback: It is often possible for the educator to watch or replay complex learner actions during the game, something that would be difficult to achieve in a real-life demo.

Situated cognition”: “ Games are effective partly because the learning takes place within a meaningful (to the game) context. What you must learn is directly related to the environment in which you learn and demonstrate it; thus, the learning is not only relevant but applied and practiced within that context” By researcher Van Eck,

## The most common application areas for Serious Games are:

Health Care: Applications range from patient treatment to health education for medical practitioners. As an example of SG in medical staff training, haptic technology provides people a sense of touch in computer-generated environments [16].

Military/ Government: Using game-based simulations, the military saves significant amounts of money, cutting expenditures in fuel, ammunition, maintenance, and so on. In addition, games are generally orders of magnitude safer than live training while still offering significantly realistic and useful training experiences. For example, America’s Army [AME 05] [17]

Corporate: The use of games in the corporate environment represents one of the fastest growing sectors of the serious games industry. Companies like IBM, CISCO and other technically savvy companies already use simulations and games to motivate staff to learn specific job-related skills [18]

Games for Good: Games for Good leverages game mechanics for social benefit. Games created for this segment of the industry hope to teach, train or simply generate awareness of a topic, an issue or a societal problem, therefore creating change – in thinking, actions or attitudes. “ Ex: Games that teach young people to become globally conscious citizens, contributing their own solutions to social issues” [18]

Education: Games are changing the way children learn, helping them think differently and stimulating new ways people of all ages can use their minds.

Limitations of Serious Games:

“ Although games can be effective learning environments, not all games are effective, nor are all games educational. Similarly, not all games are good for all learners or for all learning outcomes.” By- Diana Oblinger, 2006

Some of the possible issues that may limit Serious Games benefits and that need to be considered are as follows:

Playing the game becomes more important than the learning

Cost of producing a game exceeds learning return on investment

Game takes a long time to produce and is ineffective at training

Game too easy or too hard

Learning curve to start playing game is too high for the target audience

Learner remembers game but not content

Other learning tools may be more effective

Information incomplete or inaccurate in the game

The game is too difficult to maintain or keep up to date

Keys to Success in Serious Games

## How to make it work? How to ensure the purpose of the serious game is achieved? Suggesting here some tips to make serious games achieve its purpose and get the ultimate desired result. [19, 20, 21]

Know your target audience: People are different and so can be learners who will like different types of games, so it’s recommended to provide more than one game, targeted to different audiences as to cover the different needs of people.

Focus in on specific objectives and outcomes: Choose a game that supports the learning objectives and content, but balance this with the requirements of game play.

Don’t make the game too easy: Easy learning games do not produce good learning outcomes. Learners are more likely to remember when things go wrong

Use competition and/or collaboration: As competition motivates learners and collaboration allows social learning that is effective in motivating behavioral change.

Test: Even the simplest games can have unexpected faults.

Consider having learners create their own games: This can be useful exercises because it requires the student to think through the subject thoroughly and think of challenges they may like to have.

Future Research:

How to prove that Serious Games business is really worth it and how to calculate the ROI? I believe this is one of the hardest question facing serious games, as such a 1: 1 relationship between a game and a desired outcome is often hard to tease out in something as nebulous as diversity training.

Another interesting search area will be a “ Customized Serious Games design” represents a new, complex area of design for the game world. Where designers have unique opportunities to make a significant contribution to game design, by organizing game play to focus on changing, in a predefined way, the beliefs, skills, and/or behaviors of those who play the game, while preserving the entertainment aspects of the game experience all based on different users needs.

## Conclusion:

The fact that games are part of our everyday life in one way or another cannot be ignored; and examples can vary from our direct gaming “ plays a game on your smart phone or online using your social network profile with your direct intent to play” to indirect gaming “ collecting points via grocery shop cards without your intent to play”.

Games main goal is entertainment, but they have more universal applicability that gave extra functions in various aspects of everyday life. Which produce Serious Games, the games that are intended to not only entertain users, but have additional purposes such as education and training. They can be similar to educational games, but are primarily focused on an audience outside of primary or secondary education. Serious Games can be of any genre and many of them can be considered a kind of edutainment, but the main goal of a serious game is not to entertain, though the potential of games to engage is often an important aspect of the choice to use games as a teaching tool.

When deciding to use a game for training, it’s important to clearly state your learning objectives and to determine exactly what advantages the game will provide to the player. If the game is too easy or too hard, or does not focus on the objectives, it may simply waste the learners’ time. Depending on the type of game you intend to use, you may need to go through a substantial testing phase to ensure success.

A serious game is usually a simulation which has the look and feel of a game, but is actually a simulation of real-world events or processes. The main goal of a serious game is usually to train or educate users. Furthermore, in order to stimulate the learning effect of the players/trainees experiments, direct feedback from the game on the actions of the players is essential. Designing effective, engaging serious games requires theoretical understanding of learning, cognition, emotion, and play.