

# An Application Framework for Serious Games Integration in Companies

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## Abstract

*Serious Games are games that educate, train and inform using entertainment principles and creativity. Serious Games have provided a body of literature related to the potentials for application in different fields such as government, educational and healthcare management. The use of Serious Games in corporate settings is extensively studied and investigated by researchers. However, less investigation has been focused on the integration of Serious Games in the corporate context.*

*The conceptual framework described in this paper illustrates alternatives for Serious Games integration into corporate settings. The framework provides an opportunity for critical reflection on how Serious Games can be valued in companies with respect to concepts such change management, corporate training, decision-making, or skills development. In addition, case studies illustrating the application of Serious Games technology with respect to each area of integration are presented. Finally, future work is explained to direct the research towards modifications based on appropriate framework evaluation strategies.*

## Keywords

*Serious Games, Innovation, Classification framework, Corporate Settings, Gamification.*

## **1 Introduction**

Serious Games are ‘more than fun’. A brief survey of the literature reveals that serious games are (digital) games used for purposes other than mere entertainment. Serious games have more than just story, art, and software. Zyda (2005) describes formal definition for Serious Games: “Serious game: 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.”

Game-based methods and concepts as well as game technology are combined with other ICT technologies and research areas and applied to a broad spectrum of application domains ranging from training, simulation and education to sports and healthcare, corporate, government or any other societal relevant topic or business area (Göbel et al, 2010).

Serious Games, as an innovation that uses IT-based techniques, create more dynamic corporate environment. Serious Games introduce different number of applications in corporate settings. Examples of this could be teaching employees to solve problems in a non-traditional way using trial and error or by developing marketable business skills. Beck and Wade (2004) show that compared to non-gamers, employees who train with video games are good at “multi-tasking, good at making decisions and evaluating risks, flexible in the face of change and inclined to treat setbacks as chances to try again (cited in: Crandall and Sidak, 2006).

In this paper we are seeking for elaboration of specific methodologies for a non-intrusive integration of Serious Games, as an Innovation, in the existing corporate contexts. These methodologies should cover guidelines, best practices, examples, assessment criteria and integration tools, as well as evaluation. We discuss the necessities of innovation integration from the perspectives of discipline development of innovation management, literatures review of Serious Games research and the application of the innovation in the field of corporate settings. These methodologies are already under the process of development and directs future research stream in the field.

## **2 Background**

Sed Scholars from variety of disciplines have studied different perspectives of innovation and referred to innovation as a complex construct. At the corporate level, researchers have generally defined “innovation” as the development (generation) and/or use (adoption) of new ideas or behaviours

(Damanpour and Wischnevsky 2006; Walker 2008; Zaltman, Duncan, and Holbek 1973). Organizations produce and introduce innovation for their own use or for use in other organizations. The generation of innovation is a process and the outcome is new to the corporate community (Damanpour and Wischnevsky 2006).

Serious Games can be defined as an IT based framework and a serious business that improves training, efficiency, and productivity in a variety of industries. Serious Games design and development has progressed towards becoming an innovation in high-technology industries (Crandall and Sidak, 2006). IT based frameworks and techniques, such as Serious Games, are integrated in corporate settings and such an evolving process is considered as an innovation (OnlineEduca, 2011). Success stories exist about integration of IT Frameworks into corporate settings. In addition to generally positive economic benefits, advantages such as convenience, standardized delivery, self-paced learning, and variety of available content, have made IT-based technology a high priority for many corporations (Strother, 2002).

Innovation is generated in different fields. Innovation integration in corporate settings is a complex system engineering, considering that there is interplaying and interaction among all the subsystems of corporate environment under the given objective, resources, and organization. The research on the corporate settings innovation integration will help to study and take full advantage of the rules existing inside an enterprise and the regulations affecting the enterprise from the outside environment which may effectively speed up the classification of the corporate settings innovation integration.

In this paper we introduce a classification diagram that helps organizing the explicit knowledge and intelligence in an efficient way to understand possible directions towards integration of Serious Games into corporate settings.

### **3 Methodology**

We used the case-study research methodology and derived the framework by analyzing different case studies. Theory building from case study research is particularly appropriate because theory building does not rely upon previous literature or prior empirical evidence (Eisenhardt, 1989). Using the case analysis approach we concluded that training and intervention have a long tradition in terms of integration in corporate

settings. However, new methods have emerged recently – viral diffusion and Gamification.

Serious Games can be integrated into corporate settings in four main ways (See figure 1 below):

- 1) in corporate training,
- 2) in active company interventions,
- 3) through viral diffusion
- 4) Gamification

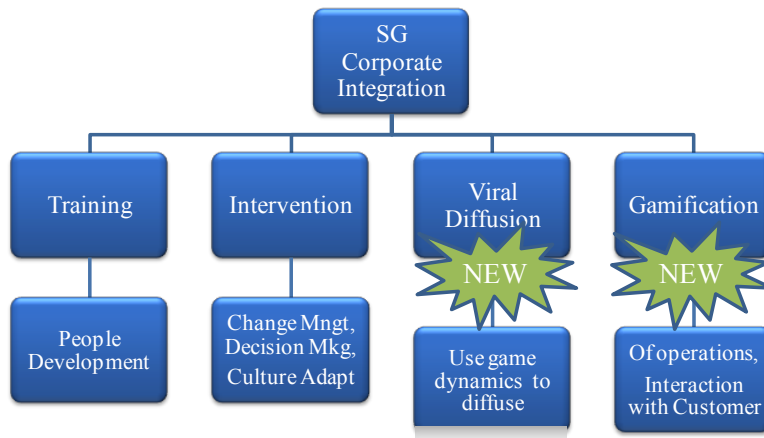


Figure 1: Serious Games Integration in Companies

These four ways are described below:

#### 1) Corporate Training

Games-based learning is gaining credibility and popularity for corporate training. As more and more people play computer-based games for entertainment, corporate employees have come to engage easily with game metaphors and interfaces. Facilitated discussion during the game can solidify the information. Discussion also builds buy-in for the corporate objectives the training supports. Employees enjoy the interactivity, and most people will select “playing a game” as the preferred learning model when given a choice. In addition, according to result of research on Serious Games performed within the GaLA network, the effectiveness of knowledge transfer to the job makes serious games a good investment for the company.

As an example, INNOV8, developed by IBM, is a simulator of business activity using interactive 3-D, which helps teach key aspects of managing business processes and facilitates communication between business managers and IT staff of a company. This type of game, although fun, is based on realistic events and processes. The game was taken very seriously and has proved to be an effective method in training initial, continuing and accelerated development of new skills of employees.

## 2) Active Company Intervention

Within the tradition of change management, interventions in companies (typically by consultants) have been used to improve the company. Serious games have also been used as interventions in companies. The aim of these interventions is not to train people, but rather to help transform the people and the company. Classic examples of this approach are LEGO® Serious Play™, a facilitated workshop, where participants are asked different questions in relation to an ongoing project, task or strategy (Lund et al, 2011) and the SimLab™ method (Smeds and Poyry-Lassila, 2011).

## 3) Viral Diffusion

Similar to viral marketing, the viral diffusion of games in corporate environment happens through strategies such as social networks, awareness of the use of certain games in specific application areas, word of mouth and other techniques. Games integrated through viral diffusion happen outside the formal structure and training processes of companies – the SGs are simply made available to all the relevant staff and marketing campaigns, or tournaments organised, to encourage uptake of the game. This strategy for integration is new and has been enabled by employees having desktop computers and especially recently by mobile gaming.

## 4) Gamification

Finally, Gamification is the use of game design techniques and mechanics to solve problems and engage audiences. Typically Gamification applies to non-game applications (also known as "funware"), particularly consumer-oriented web and mobile sites, in order to encourage people to adopt the applications (Zickermann and Lunder, 2010). It also strives to encourage users to engage in desired behaviors in connection with the applications. Gamification works by making technology more engaging, and by encouraging desired behaviors, taking advantage of humans' psychological predisposition to engage in gaming (Radoff, 2011). The technique can encourage people to perform chores that they ordinarily consider boring, such as completing surveys, shopping, or reading web sites. Gamification can be leveraged by companies as sophisticated marketing techniques, wherein customers are engaged in games, while simultaneously being exposed to the company – this can either be in a passive way similar to advertising or more sophisticatedly by engaging customers in a game which encourages their consumption of the company's products/services – eg. A mobile treasure hunt, etc. (Cook, 2010).

In addition to that described above, theoretical work on innovation adoption and how Serious Games can be seen as innovations was carried out. The existing Technology Acceptance Model (TAM) (Davis, 1989) was reviewed and possible refinements to it discussed. This theoretical work will continue – so as to explain how and why serious games are adopted in business and industry. The outcome of this part of this research will be used to modify or improve the classification framework to the next version.

### 3.1 Case Studies

Below descriptions of the case studies used in the development of the framework are provided. The cases are from ABN Amro bank, Novo-Nordisk pharmaceuticals, Working Environment Service, and eBay. Each case study corresponds to one of the four integration categories described in the classification framework.

#### *3.1.1 Working Environment Service Case Study – A Case for Corporate Training*

The Working Environment Service serves as a national centre of working environment knowledge in Denmark. The organization obtains and communicates knowledge about the working environment from companies, projects and research based knowledge. The Working Environment Information Centre wanted to create an online experience, where public employees could learn about the constructive, individual approach to managing stress. The goal was to teach the player how to identify different types of stress and different ways to manage it, as well as showing ways to reduce stress in their everyday work.

The solution consists of a 2D Flash role-playing game, where the player can choose between different working environments, such as offices, hospitals and schools. In the game, the player encounters different problems and situations that can potentially create unhealthy long-term levels of stress. Depending on the players' decisions, the stress-barometer goes up or down Serious Games Interactive (2011).

#### *3.1.2 Novo-Nordisk Case Study – A Case for Active Company Intervention*

Danish healthcare company Novo Nordisk operates in many countries and knows a great deal about the challenges and opportunities that go along with moving into new markets. Novo Nordisk had reached the decision to invest over \$US200 million in the construction of a second facility in Brazil that would be 2-3 times the size of the existing one. This was a big challenge for the company. The company had to formulate a basic strategy for the Danish project leaders that would be spending 2-3 years abroad with their families to oversee the construction of the facility. Furthermore, there was a need to bring these managers together as a team – both on a professional and personal level.

Novo Nordisk decided to involve LEGO® SERIOUS PLAY™. The directors had heard about the way LEGO SERIOUS PLAY's process naturally allows group members to seek and identify important problems and then allow for free expression of problem-solving ideas – and they were willing to experiment. A two-day LEGO SERIOUS PLAY Real Time Strategy session, which even included dialogue with existing Brazilian management, allowed the team to do decision-making and reach consensus on a concrete overall strategy for the construction of the new facility. Through LEGO SERIOUS PLAY, team members were able to identify problem areas that they had not previously seen – including some practical concerns about how their families would adjust to living abroad LEGO Serious Play (2011).

### *3.1.3 ABN Amro Case Study – A Case for viral Diffusion*

This case presents the application of a serious game to educate and teach each employee on how they can translate core company values to everyday service. The company is an all-round bank servicing retail with private and commercial banking clients. Although the company is strongly represented in the Netherlands, the private banking company offices and services are also internationally established in 13 countries and territories. According to the latest annual report the company employs 26000 FTEs worldwide.

The serious games project was aimed at learning employees of the private banking network (up to €1 million sales) how to deal with the core values of the company in everyday life as an employee. For this project one of the three company core values was selected (the core value “Trusted”) and used as a basis for the game. “These core values can become a container concept so easily, we wanted to bring the concept closer to the employee. What does it mean for me?”. The serious game was developed in cooperation with an external serious game developer and after a successful launch has already been followed by two other serious games.

### *3.1.4 eBay Case Study – A Case for Gamification*

Plantville™ is a new online gaming platform that simulates the experience of being a plant manager. Players are faced with the challenge of maintaining the operation of their plant while trying to improve the productivity, efficiency, sustainability and overall health of their facility. Plantville is an innovative, educational and fun way for Siemens to engage customers, employees, prospects, students and the general public while driving awareness of Siemens technologies and brand. The game enables players to improve the health of their plants by learning about and applying industrial and infrastructure products and solutions from Siemens. Gamers will be measured on a number of Key Performance Indicators (KPIs), including safety, on time delivery, quality, energy management and employee satisfaction.

Throughout the game, players will be able to interact with Pete the Plant Manager, whose plant has just won the “Plant of the Year” award. Pete shares his best practices throughout the game to help players achieve

outstanding results in plant performance. He will use webisodes, the Plantville Café, Puzzlers, and Facebook, LinkedIn and Twitter accounts to dialogue with gamers, provide hints to playing the game, and host a leader board for contestants.

In Plantville, players can select which of the three virtual plants they would like to manage first: – a bottling plant, a vitamin plant or a plant that builds trains. At the start of the game, each type of plant is faced with different challenges. The players must identify the challenges facing their plant and implement solutions to improve the plant's KPIs. Gamers will compete with one another on a number of levels, including plant-to-plant and on specific KPIs. Pete's leader board will keep track of which players are performing the best on each of the levels. Plantville also uses brain teasers called Pete's Puzzlers that test a gamer's problem solving abilities. Also a fun and educational platform called Plantville café is used to offer periodic online chat sessions with Pete on topics like process control, energy efficiency, industrial networking and more.

#### **4 Conclusion and Future Work**

The work described in this paper is an ongoing research on the integration of Serious Games in companies. We briefly reviewed the tradition of the use of SGs in Business and Management and referred to some selected works in this field. Further we focused on the use of SGs for corporate training and de elaborated on possible new ways for incorporating the SGs in companies.

The integration framework introduced in this paper helps building the basis for knowledge creation based on classification information. The integration framework discussed in this paper is an analytical tool that classifies the ways in which SGs can be used in companies.

Future work should focus on validating the framework by continuing to collect case studies. Documenting more case studies can help for stronger justification of the framework.

The Serious Games Integration Classification framework helps us to understand the complex process of integrating Serious Games into corporate settings. In the future, more research can focus on understanding the level of integration of SGs in companies. To achieve this aim, identifying the barriers or the benefits of the Serious Games integration in companies can be beneficial. Proposing suggestions for overcoming the barriers towards integration and to improve the benefits of the use of Serious Games in companies are possible future work direction.

More further work can focus on understanding how well Serious Games can be integrated in companies. This consists of understanding the barriers, gains and benefits, and then to investigate how to improve the benefits of and overcome the barriers towards the use of the Serious Games. this can be overcome.



The Framework introduced in this paper helps us to build up understanding the Serious Games integration more effectively and defines the basis for future research in the field. There is a need to carry out in-depth case studies of the implementation of SGs within companies for each of the discussed ways of integration identified by the framework.

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