Technology, 12(4), 291-297, (2009)

TECHNOLOGY

CASE FOR GAME-BASED LEARNING IN ENTERPRISE SOFTWARE SYSTEMS: APPLICATION OF MASSIVELY MULTIPLAYER ONLINE GAME TRENDS ON BUSINESS STRATEGY SOFTWARE TRAINING CONCEPTS

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Abstract

Computer games have been an integral part of the learning environment for a long time. This also includes learning in business administration and management areas. Recent advances in Internet-based large competitive environments, also known as MMOGs and MMORPGs, new trends in pedagogy and successful application of such platforms in corporate training and selection processes have given us ground to argue the case for another area of application, management information system software the usage of which requires not only technical knowledge of the computer tasks but also a strategic knowledge of business. It is explored in this paper that the Internet-based massive competitive learning environments based on modeling of business strategy is an applicable combination for the large-scale training for MIS requirements. The research is part of studies conducted on site at SMEs in the European Commission 7th Framework ELEVATE project that explores a common e-learning ground for software developing European companies.

Keywords: E-Learning, Simulation Software, MMOG, MMORPG, MIS,.

1. Introduction

One of the fundamental trends in e-Learning is capturing the attention of the user or student, which is competed by many other media and platforms constantly. Therefore the educational content must be engaging enough to keep the student dedicated to the learning activities. [1] gives a list of study background in capturing the attention of and engaging the learner. Therefore e-learning is not just compiling information and making it available to the learner but rather creating an environment where the learner continuously adds up to his or her knowledge in an effective and permanent fashion.

In e-learning activities, and certainly in corporate or small-to-medium enterprise projects, this has not been always the case. The traditional content, either in the fashion of video material, e-books or Adobe Flash material resembling Microsoft PowerPoint presentations have not been interactive enough or created an engaging environment. The task is becoming increasingly difficult as the target learning community is increasingly accustomed to highly sophisticated environments such as various genres of computer games or other technology based communication platforms, where they interact, learn and act with high speed and feeling empowered.

Therefore, in this paper we first review the state of the art in e-learning and discuss alternatives that can increase the competitive edge of the enterprises by providing their workforce effective learning. We have first looked at e-learning in a general top-down manner from a pedagogic side with regards to the games, communities and projects. Then we examine technologic implementation possibilities and integration. Finally we propose the case for synthesis of the methods.

2. Game-Based Learning

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The first documented use of games for educational purposes extend back to the 19th century when Prussian army started training officers by having them play simulated battles on printed maps with detailed rules [2]. To make a definition of a game, [3], one of America's commercial educational simulation and gaming pioneers, describes it as "any contest among adversaries operating under rules for an objective." Games have been used in the military medium for centuries, however it also cached on in the business community since mid 20th century, string with non-computer versions, naturally. With these first management games a scientific community researching the results of the games has been formed in the 1950s [4].

Not differentiating games on whether it is computer based or not, the main publishing venue for this community is the Journal of Simulation & Gaming [5]. On decline of this established community [6], A more recent but separate scientific community has followed with the advent of computer games and has achieved momentum in the new millennium [7], focusing exclusively on computer games with several publishing venues including the Journal of Game Design, Games Research and Game Studies. Business education games, and in particular computer games, are focus of academic research for half a century in an exponential fashion. It is therefore unnecessary to argue if games have a place in education as majority of researchers have moved on to issues of how, rather than if, games can be used in education [8].

2.1 Games employed in education and training

In learning, whether it is school teaching, higher education, or vocational training, games have been a part of the field for a long time. We are more interested in games that create a complete environment and force players create their own strategies to win and teach them along the way the fundamentals of the environment.

It may be worth making an analogy with the pair computer game based mass education and traditional education and the pair theatre and cinema. Films have been a mass education environment, leading fast social behaviour change, in both authoritarian countries and democracies in both war time and peace time. In the early 20th century films were mostly theatre-like, even until recent times, not utilising fully the possibilities of film medium, save some pioneers. Today the film is perhaps the collection of all arts and technologies meeting in a single channel as a single art form. Computer games are the films of the 21st century with even more possibilities in learning.

3. Strategy games

The following are the game genre definitions that have been advised by the British Education Communications and Technology Agency's Web site [9] that are worth mentioning for our interest:
Management games: Usually based on economic management in a simulated environment. The player must raise funds to pay for maintenance, wages, research, a new striker, etc. They can be very complex and a single game (or 'career') can continue indefinitely.

Real time strategy: The player will normally command groups of units and gather resources to fund further expansion. Units move in 'real time' synchronous with the opposition's units. Games are usually themed around warfare or empire building by conquest. The imagery and level of violence can vary greatly.
World-building games: This category covers a wide range of game styles (some may also be called simulations). Essentially, the player must manipulate either a character or an environment to encourage development and progress.

3.1 Strategy simulations

We need to terminologically differentiate the strategy game and strategy simulation, and find that often they refer to the same concepts. Harold Guetzkow (1963), a founder of simulation studies, defines the term of simulation as an operating representation of a central feature of reality. Leaving aside for the moment the issue of whether or not there can be a simulation of something that does not exist, Guetzkow's definition asserts operation is a key element of simulation[10]. Bloomer (1973) believes that the "operating" requirement neatly removed static representations such as maps, pictures and diagrams from the category of simulation. By this definition, a full description, with charts and diagrams, even interactive information service does not form a simulation in Management Information Systems area but manipulation and driving of business functions would be a simulation[11].

It can therefore be summed up as "a simulation is an operational model based on reality". From this point of view a game and a simulation are separate concepts though they are not mutually exclusive. Many games are based on simulations, or simulation are presented in the form of a game. Such a combination would be defined as a contest with low risk and rules in an operating model of a reality. Carrying an operating model of an e-business dot-com company within its environment of finance, goods, logistics, communication, can be used for a game where the player has to manipulate IT projects, logistics investment, community strategy, etc.

3.2. Historic examples

It is explained above that the games have been used in various training and education purposes in areas as wide as universities, defence training, vocational and business training. Here we shall have a closer look at the specific subjects, online multiplayer games and business strategy games. Among strategy games a few is worth mentioning in terms of proven historic record.

The game "where in the world is Carmen San Diego" was the first in a series of Carmen San Diego games from 1985. In this game, players took the role of detectives working for the Acme agency. They followed clues and learned geography, culture and history in order to track down the infamous Carmen San Diego. The game was popular in both homes and schools.

Another game, SimCity, introduced in 1989 as a strategy game, was probably the first mainstream game to be used in classrooms. It is certainly the most researched case [12]. Players directed the development of a model city. The game's success has led to an entire family of Sim games. It was not intended to be used in schools, but teachers and graduate students have developed a substantial body of material to support classroom use of the game [13]. In classes including Social Studies, English, History and Economics, teachers have used versions of SimCity to improve student understanding and retention [12]. SimCity is one the computer games most researched in relation to education [14]. Pahl (1999) believed it was a game that could enhance learning in any curricular area. That broad claim was based on the premise that SimCity could be used to teach higher order thinking skills and that all curricular areas could be improved by directly teaching higher order thinking skills [13].

Sid Meier's Civilization III was the third instalment in extremely popular Civilization and Call to Power series, where players attempt to guide their chosen civilization to global dominance over the course of thousands of years. Civilization III, which is another strategy game, allows players to design their own custom scenarios for the game. Game companies encourage the development and sharing of scenarios as a way to increase the replay appeal of their games. This introduces the online community and collaborative experience possibilities. Civilization III has been used experimentally as a classroom tool with customized scenarios to guide students' experiences [15].

3.3 Business strategy games

As mentioned previously it goes half a century back when American Management Association published its first business game [16]. It was a simple simulation game where players took on the role of a manager attempting to navigate their way to success while being confronted with a variety of events and challenges. Games, simulations and case studies quickly became popular management training tools. They provided a bridge between theories taught using textbooks in classrooms and real world business experience.
The above genres are, again, not mutually exclusive and there may be intersection of all these genres. In fact we may be looking for almost real-time management strategy games to offer role playing in a world building simulation. If we want to support the European small enterprises in terms of IT strategy, our objective can be to realise the above by creating a model of the IT management environment and engaging the people responsible for it in the company in developing the situation to the benefit of the company in a competitive environment, where he or she can make mistakes during learning without harming the company.

3.4 Massively-multiplayer games

A recent interest in cooperative online gaming, especially Massively Multiplayer Online Role-Playing Games (MMORPGs) and Internet-based gaming communities, indicates the potential for using online computer gaming as a method of implementing cooperative learning theories. At the opposite end of the games spectrum from the single stand-alone game is the massive multiplayer online game (MMOG), and the division between a standard

multiplayer game and an MMOG is several orders of magnitude. MMOGs have the capability for thousands of players to play the same instance of a game simultaneously. They are designed to be played exclusively online. Everquest, Lineage and Dark Age of Camelot are a few examples of this class of game [17].

MMOGs are different than other networked games too in that they are persistent, virtual worlds. Single player and most networked games are usually replayable, one-story games. The play or players start the game and then play it to a conclusion in either one or multiple sittings. Afterward the game is turned off. Future uses of the game start over from the beginning or replay from a saved version of a previous game. MMOGs do not end. Players login and logout while the game world continues to run on the servers. Players can advance and improve in the game, but while they can have many victories; players do not win or lose an MMOG, but they win or lose over and over again inside the MMOG.

4. Pedagogic Trends

We now examine pedagogic trends in learning, starting with advantages of games and going on with the recent conclusions on different methodologies and perspectives that will form the basis of our case.

4.1 Pedagogic advantages of games

We have discussed in the early parts of this project proposal on the pedagogic advantages of games and here are the most relevant of them [18].

One aspect is learning without being aware. This happens as players try to win or explore games [19]. Games researcher Kurt Squire reports the geography and history of the Caribbean can be learned from playing Sid Meyer's Pirates [20]. In schools, learning tends to be a self-contained activity, while in games; the point of learning is to win the game [21].

Games also provide sharing a framework with learner. What is a simple matter for an expert is often a complex, confusing or wholly unintelligible jumble to a novice. Games can create a context for new knowledge that can help novice users build an intelligible mental model from a jumble of seemingly disconnected facts.

The advantage of a common experience is another aspect. Computer games in popular culture make it a virtual certainty that a computer game used in school will relate to other games with which students are familiar. Thus games could be a means of building bridges between students' existing experiences and the body of curricular material schools and society require students to learn.

Failure with affordable or psychologically less testing penalties makes games advantageous. One of the strengths of video games as educational tools is that they allow the opportunity for what has been called soft failure. Traditionally when students fail, there is a penalty. Whether it is a poor grade or simply a red mark on homework, the failure is an end in itself. In video games, failing at a task is usually a temporary set-back and not the end.

Feedback speed is one of the preferential points of games. Games and simulations provide rapid feedback. One issue that is discussed in relation to computer-based teaching is the impossibility of having a program that could intelligently respond to all of the questions and difficulties a student would have. Games provide feedback quickly. A player attempts an action and knows very soon whether it was successful in most games. to make additional attempts. Only ultimate success is important.

4.2 Communities and collaboration

Online communities are a key factor in the development of the Internet based society and business models. In online communities, users interact with each other, share information and cooperate, forming specialised groups either according to interest or according to demographic criteria. In online learning communities, it is expected that users interact with each other as well as the tutors and work together towards the common goal, learning. From a pedagogic point of view, Piaget's argument that effective communication and discussion was only possible where there is symmetric power between the two sides of communication holds in the online learning communities, where students have similar power to understand and solve problems [1].

The emergence and prominence of the World Wide Web, with its new possibilities of communities, is thus considered the "new pedagogy of learning" [22].It is therefore imperative that an approach is based on the online learning community principles. Web 2.0, the new approach based on Internet communities, also encourages significantly more interaction between users, a feature that many theorists argue is vital in e-learning. Interaction encourages deeper and more active learning engagement, builds communities of learning [23]and enables feedback from tutors to students. [24] In recent studies, associations have been reported betw een tutor–student interaction in online learning and raised levels of student motivation [25,26]. A growing spectrum of applications is enumerated as several emerging technologies and applications under the Web 2.0 platform. These include RSS, wikis, blogs, and the user comment functionality found in various Web sites [27].

4.3 Cooperative learning pedagogy

Cooperative learning is the instructional use of small groups so that students work together to maximize their and each other's learning [28]. There are many benefits enlisted. It can be that the students give help, assistance and support to each other. This methodology also exchange information and resources, and optimize their understanding of that information as they share opinions, points of view, and teach others about the material. It gives and receives immediate feedback and help on work.

The pedagogy has also other advantages. It enables engaging and challenging one another's reasoning as material is discussed, giving rise to critical thinking. It provides extra reasons for achievement. Comparative learning pedagogy ensures an influence between learners to improve each student's methods and thought processes. It depends on taking part in the activities and developing the skills necessary for effective teamwork. As a result it allows evaluating the efficiency and effectiveness of peers and the group as a whole in order to improve overall results.

4.4 Problem and project based learning

In Problem-based Learning (PBL), which has been seen as a pedagogic breakthrough in education, the focus is that students collaborate in first determining the nature of the problem and then a solution and resolution of it [1]. Tisha [29] tries to find an ideal size in the facilitation of such PBL communities and discusses in the moderation of such communities to extract optimum benefit from them [30].
A further point from PBL is Project-based Learning, where the instruction and learning activities are all towards a single goal of completion of a project whether the instruction period is a typical one academic semester or much shorter for vocational training. One of the most prominent supporters and practisers of this approach – in both online and traditional media – is Aalborg University, Denmark. This institute constructs its online courses from the start around the completion of a project, where students are given a direction and focus, and concentrate efforts to reach a certain goal [31]. It may be argued that in game-based learning, if collaboration through communities is possible, it is again a project-based learning case where the aim is set from the beginning.

Another pedagogic case for online games, especially MMOGs, from the community and problem-based learning approaches is the Computer Supported Cooperative Learning (CSCL) paradigm. It is a theoretical paradigm for the use of online role-playing games that focuses on the use of information and communications technology as a mediating tool for collaborative virtual environments (CVE). It emphasises an understanding of language, culture and the social setting, founded in the social constructivism. CSCL is also worthwhile where problem solving or project-based learning is concerned [28] with achieving a common group goal. This CSCL community argues in their 2002 newsletter that learning in cooperative groups while utilizing the tools of technology needs to occur in all grade levels and subject areas. They defend that schools need to increasingly utilize technology-supported cooperative learning.

The key theoretical domains exist in regard to those CSCL theories related to problem-based learning and project-based learning. A MMORPG by its nature is both problem and project based in learning. Problem-based learning (PBL) is an effective technique for motivating students to learn about information and concepts needed to help solve a problem. While most of the theoretical framework is grounded in data, the initial theoretical perspectives come from a combination of computer supported collaborative learning (CSCL) and games design theories.

5. Conclusion: the case

As a result, we conclude at this point that the pedagogic research and practices point to game and simulation based learning, online community-based learning and problem and project-based learning. That entails an environment in which the learner both collaborates and competes with his or her peers, solves problems and takes up projects that are based on a model of the tasks of the subject matter of learning process, remains in experiences very similar to the actual and finally finds engaging and competitive with other multimedia attention magnets around modern man. We estimate that such a learning environment is even more relevant for learning of modern management information system software which unite in itself the new media, computer networks and software.

We therefore reason that the optimum point of the intersection of above requirements can be massively multiplayer online games that are adapted to the needs of business strategy games. There are a number such game challenges on the Internet for strategic management, for stock exchange operations and other business subjects. However, for business software, in areas such as customer relationship management (CRM) or enterprise resource planning (ERP), which not only require technical competence of running software tasks and operations but a deeper business knowledge in the subject areas where the software is set up as a solution, there are no hybrid competitive strategy games.

Hence this paper concludes that application of massively multiplayer online game concepts and business software simulations can be brought together with maximum impact in learning of such widespread software. This means a worldwide Internet game that not only assumes setting up imaginary companies for competition, but also allows such operations on the selected software.

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