Abstract—It is common ground that the generation entering the workforce, also known as the “Next Generation”, the “Net Generation”, “digital natives”, the “millennials” or the “Google generation”, has a different set of needs and expectations as to learning and training. This new generation of people, such as the MMOGs (Massive Multiplayer Online Games) users, has amassed thousands of hours of rapidly analyzing new situations, interacting with characters they don’t really know, and solving problems quickly and independently. Moreover, it is claimed that MMOGs are popular mainly because they motivate players to create communities and interact with each other. On the contrary, the high dropout rate of e-learning is linked with low rates of self-motivation and self-direction in e-Learning. According to these thoughts, there is a need to find new e-learning environments that would ensure the learners’ greater motivation and persistence to e-learning courses. Thus, the current research in the e-learning field is focusing its attention in using online games and virtual worlds as educational tools that would motivate and engage learners. This paper presents the evolution of digital educational games through the years, and dignifies the need for creating collaborative educational online games, by taking into account the popular commercial MMOGs, in order to provide engaging open-ended educational environments that foster collaboration among students/players. This interaction could lead to the development of networked communities of practices, which could trigger cognitive, affective and social aspects of the player’s behavior. This paper also includes the findings of a research that tried to answer the question “What motivates people to play MMOGs?” by highlighting the important factors that build a strong sense of community in a popular MMOG called World of Warcraft (WoW). The results of this research could conclude to good game design principles for the development of effective online educational games for the next generation of workers.

Index Terms — Games, Motivation, E-learning, Next Generation.

I. INTRODUCTION

It is common knowledge that 21st century people require a different set of skills in order to cope with the complexity and the faster pace of life. The skills people need to develop have to do with problem solving and identification, developing critical facilities, understanding the value of experimentation, and the ability to collaborate [1]. Next generation people need to develop “digital age literacy, inventive thinking, effective communication, and high productivity” [2]. These are known as “the skills for 21st century”, or next generation skills and they are all fundamental to the success of knowledge workers [3].

According to that, Dede [4] has identified three specific abilities that are of growing importance for the next generation of workers:

• Collaborate with diverse teams of people—face-to-face or at a distance—to accomplish a task.
• Create, share, and master knowledge by assessing and filtering quasi-accurate Information.
• Thrive on chaos, that is, be able to make rapid decisions based on incomplete information in order to resolve novel dilemmas.

Learning in nowadays is not longer considered as an individual process, but as a social one, that is, now more than ever, influenced and accomplished through a network of peers, colleagues, friends, and family [5, 6]. Thus, as our need for collaboration grows, so too have the tools that connect us in social networks and support the creation of online communities [7, 8].

Online communications facilitate groups of people coming together over the network to discuss any issue imaginable, to ask questions and share provocative insights to which others can respond [9]. These online social environments can evolve into “online learning communities” when they foster participants to actively engage in sharing ideas with others, fostering knowledge sharing. In these learning communities knowledge is generated through social intercourse, and through this interaction we gradually accumulate advances in our levels of knowing, theories derived from Dewey and Vygotsky [10].

The modern world requires that knowledge not be limited to one individual’s thinking, but rather shared and accessed in a variety of ways. Therefore, the sheer magnitude of human knowledge, world globalization, and the accelerating rate of change due to technology necessitates a shift in our educational system—from plateaus of knowing to continuous cycles of learning [2].

Thus, education and training should aim at developing 21st century skilled workers. However, employers have their doubts about formal education, stating that “young people of all abilities are finding it harder to cope in their early years at work because they have been stifled in the classroom and text book learning rather than seeing and experiencing how they learn is applied in the world outside” [11].

What is striking is that many young people today are not acquiring these 21st century skills through structured learning environments, but rather through various “cognitively-demanding leisure” activities they choose to engage with, including to a larger and larger extent, online games and virtual worlds [12]. Online gamers have amassed thousands of hours of rapidly analyzing new situations, interacting with characters they don’t really
Online games, such as MMOGs (Massive Multiplayer Online Games) and MMORPGs (Massive Multiplayer Online Role-Playing Games), are not games in the traditional rules-based sense, but rather “persistent social and material worlds, loosely structured by open-ended (fantasy) narratives, where players are largely free to do as they please”[14].

As Marshal McLuhan stated “Our age of anxiety is largely the result of trying to do today’s job with yesterday’s tools”. According to that, education and training needs to be reformed, providing innovative tools to teach the new generation of 21st century skilled workers.

II. THEORETICAL BACKGROUND

A. Online Games and Education

A significant body of research supports the use of online games as educational tools. According to the cognitive approach of learning, games could be beneficial for multiple reasons [15]. It is claimed that knowledge or skills learned and practiced are more likely to transfer in new information [16].

Moreover, games put the learner in the role of decision-maker, pushing players through ever harder challenges, while learning is accomplished through trial and error [17] by receiving immediate feedback on their actions and decisions, inviting exploration and experimentation [18].

Online games are well-sequenced in levels of increasing difficulty, complexity or pace, with success at subsequent levels contingent upon competencies mastered at previous levels and can be used as an educational tool because they have clear objectives, often set at multiple difficulty levels to adapt to the prior knowledge and skills of each learner [16]. Most importantly, the pace of the activities can be adjusted for faster or slower learners, novices or experts, to truly deliver differentiated instruction and this is the embodiment of the spiral curriculum [19].

The above well-known researchers are only some of those that suggest that the prospect of using games in the teaching process is more than promising. It seems that games can teach people in a fun, engaging, motivating, interesting and encouraging way, enabling the teaching of complex new information, otherwise too difficult to be taught in a classroom, since knowledge can be adjusted for different types of learning, and leading to the development of strategic skills through experimentation and trial and error [20, 21, 22].

B. Educational Games: Their evolution through the years

The educational value of digital games has been discussed by many learning theories over the years. At first, Behaviorism, with theorists such as Pavlov, Thorndike, Watson and Skinner, sees the interaction between the player and a game as a stimuli and response procedure, where the reinforcement of the correct answer triggers learning [23, 24]. Critiques of the educational games based on this behaviorist perspective claim that these environments foster drill-and-practice and training activities, rather than deep understanding [25, 26].

Cognitivism focuses more on the player’s construction of representations of the world and the educational games based on a cognitive approach (and coding mnemonic and retrieval techniques etc) attempted to build intrinsic motivation by integrating learning and game experience [27]. Additionally, Socio-cognitive learning theory describes learning through games as an imitation of the projected behavior [28]. Constructionism on the other hand focuses on the role of external objects in facilitating the learning process leading to the creation of the microworlds [29].

Though constructionism and cognitivism focus more on the player, the sociocultural approach offers a more global perspective, encompassing the player, the game, and the context of the game [27]. Moving from the behavioural educational games to more socio-cultural perspectives, educational games need to be designed as Open-ended Environments, where students can interact with social groups (Figure 1).

Figure 1. Interaction in Digital Educational Games (Mysirlaki & Paraskeva, 2009).

C. Motivating Commercial Games: What can we learn from them?

Games were very popular since the late 90s, when Anderson [31] claimed that digital games were consuming a larger amount of people’s time every year. Back then, the average American 7th grader was playing digital games at least 4 hours per week. More recent, in Eastern Europe, the average time that young people used to spend playing digital games was 2.53 hours per day [32]. More specifically, Massive Multiplayer Online Role-Playing Games (MMORPGs) are extremely popular to a broad age range (Mage= 26.57) and have a greater average usage (22 hours of per week) [33]. The latest findings by the
Entertainment Software Association [34], reveal that 68 percent of American households play computer or video games, while the number of households playing games increased 3 percent over 2008, representing the expanding use of entertainment software.

As stated in situated learning theory [35], learning, thinking and knowing emerge from a world that is socially constructed. Commercial games (such as MMOGs) and virtual worlds (such as Second Life) are considered to be complex learning systems with a full range of social and material practices [14]. Just as in a real world community, when newcomers enter the game, they are gradually introduced to a complex social framework through the tutelage of other community member [36]. They learn to make sense of new areas, especially by engaging with others, discussing, reflecting, and sharing. Moreover, Dede [37] suggests that virtual environments and ubiquitous computing can draw on the power of situated learning by creating immersive, extended experiences with problems and contexts similar to the real world.

However, while most educational games are based on behaviouristic models providing drill-and-practice activities, commercial games, such as MMOGs, are based on their communities of players, fostering next generation skills, such as:

- Collaboration with different teams of people.
- Creation, sharing, and the conquest of knowledge through evaluation and infiltration of information.
- Thriving in chaos [4].
- Critical thinking and solving problems [2, p. 49].

Thus, we underline the need of designing educational games as open communities of learners (Open-ended environments), by using elements of online commercial games. It seems that the lessons that we can learn from popular commercial games (such as MMOGs) could be lead to the design of serious technical solutions for creating motivating collaborative educational games.

III. DESIGNING MOTIVATING ONLINE GAMES: THE NEED FOR RESEARCH

In order to deeply understand MMOGs, we need to find out what does motivate people to play them. However, the researches that discuss issues like MMOGs' use in education are rather theoretical in nature and not based on data collection and empirical findings [38]. In comparison with the significant amount of educational research and the growing interest of the scientific community in MMOGs, there is a lack of empirical research considering cognitive and social aspects of these games [14]. Online gaming is an area which has seen scant research, even less in MMOGs [39,40].

So, what does motivate players to play MMOGs? Malone and Lepper [41] focused on what makes a game motivating, describing intrinsic motivation as the feeling that one should have for doing something without external inducement or rewards, and subdivide the intrinsic motivation in individual and interpersonal factors. Intrinsic motivation is described as the motivation to engage in activities that enhance or maintain a person’s self-concept. The individual factors (challenge, fantasy, control and curiosity) motivate a player when he/she is working alone, while interpersonal factors (cooperation, competition, recognition) motivate a player when he/she interacts with other players.

These factors considered to be important for developing motivating and appealing games for 20 years now. But is this the case in the nowadays popular MMOGs, where millions of players form groups to play a game that can last for years?

Sellers [42] suggested that it is the social bonds created by players that motivate them and keep them returning to a massive multiplayer game. These initial social bonds that players form are called “temporary groups” (p. 4). So, could this sense of community created in multiplayer games be the true reason for playing a MMOG for a long period of time (maybe for years)?

Sarason [43] describes the psychological sense of community as “the perception of similarity to others, an acknowledged interdependence with others, a willingness to maintain this interdependence by giving to or doing for others what one expects from them, and the feeling that one is part of a larger dependable and stable structure” (p. 157). McMillan and Chavis [44] define sense of community as “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members’ needs will be met through their commitment to be together.” According to McMillan and Chavis, the sense of community consists of feelings of membership, feelings of influence, integration and fulfillment of needs, and shared emotional connection.

Moreover, the popularity of MMOGs is considered to be related to their ability to create a state of engagement, including psychological absorption [45]. Game engagement is thought of as an indicator for the strong sense of absorption in a game, and it includes a sense of absorption, flow, presence and immersion in a game [46]. The sense of becoming deeply engaged in games may be important when considering adopt elements of multiplayer online games for developing educational games.

Overall, could the formation of groups in a game (called guilds or clans), be the reason for developing a strong sense of community; and is this sense of community a motivating factor for playing and performing well in the game? Moreover, is the strong sense of community related to game engagement, and thus is the ability to create groups a bad practice for educational games?

These questions led to the conduction of a research considering the relationships between physiological factors such as sense of belonging in a group, intrinsic motivating, game engagement and game performance, in order to better understand the appeal that MMOGs seem to have on people, and especially on students.

This research aims at highlighting the important factors that build a strong sense of community in an engaging game, in order to conclude to good game design principles that could be used to design good online educational games.

A. Research Methodology

In order to examine the relationships between important personal and interpersonal factors, the research framework includes the sense of community in a group [44] (dependent variable), and intrinsic motivation [41], game engagement [46] and game performance (independent variables) (Figure 2).
This research was conducted in a population of 64 (12-16 years old) players of a popular MMOG called World of Warcraft (WOW), who were randomly selected to answer a questionnaire. The research focused on this MMOG, due to its popularity across the globe. Word of Warcraft is the most popular game for the year 2007 and according to Blizzard Entertainment [47], it has extended its subscriber base to 11.5 million subscribers worldwide and continuing to extend it everyday.

The research hypotheses consider the relationship between these factors.

- **H01:** Is there a relationship between the sense of community and performance in the game?
- **H02:** Is there a relationship between the sense of community and intrinsic motivation in playing the game?
- **H03:** Is there a relationship between the sense of community and game engagement?

The research hypotheses consider the relationship between these factors.

The validity and reliability of the instrument used in this research (Cronbach's Alpha) was α=0.736. Quantitative analysis techniques (Q-Q Plots, Pearson Correlation Analysis and Regression Analysis) were used to investigate the relationships between the research variables. The Normal P-P, Q-Q graphs and the results of a One-Sample Kolmogorov-Smirnov Test indicated that all the variables followed the standard Normal distribution.

**B. Empirical Research Findings**

The mean frequency of game play equals to 6 hours per week and the 37.5% of the sample reported that he/she plays WoW for more than 8 hours per week. These findings mean that players play WoW for a serious amount of time.

Pearson correlation analysis indicated a strong positive relationship between sense of community and intrinsic motivation (r=0.479**) and between sense of community and game performance (0.298*). However, there was no strong correlation between sense of community and game engagement.

These findings reveal that the ability to develop a community in a game is motivating for the players. Moreover, the sense of belonging in a community was positive correlated with the game performance, exposing an enhancement of the performance when the sense of community in a game is strong.

Furthermore, there was no relationship between the sense of community and game engagement, meaning that the sense of becoming deeply engaged in games is not related to the group formation in a game.

In order to validate the relationships between the dependent and independent variables, as indicated by the Pearson correlation analysis, a multiple linear regression analysis was conducted, showing that the Sense of belonging in a community has a relationship with Intrinsic Motivation and Game Performance, according to the Equation:

\[
\text{Sense of Community} = 1.234 + 0.427 \times \text{Intrinsic Motivation} + 0.188 \times \text{Game Performance}
\]

This relationship implies that the development of communities in a game is possible to increase intrinsic motivation to players and enhance their performance in the game. On the contrary, the negative phenomenon of game engagement does not seem to be linked with the sense of belonging in a community, which can lead us to proposing multiplayer gaming as an educational tool.

The above findings indicate that the multiplayer factor in a game is a good design principle that should be taken into account for designing educational games, where, more than anything, we want the students to be intrinsically motivated and perform well.

**IV. CONCLUSION AND DESIGN ISSUES**

When it comes to digital games, researchers lately raised the interesting question “how can one theoretical framework account for the moment-to-moment interactions that constitute gameplay (including the player’s goals and intentions) while also accounting for the broader socio-cultural contexts that situate the activity?” [48].

From such a socio-cultural perspective, the most important point in understanding how games motivate players in educational environments may be that good games motivate players in multiple ways and the interplay between these different forms creates dynamic learning opportunities [48].

Furthermore, with particular regard to the more modern game technologies such as multiplayer gaming, these interactions are becoming more complex, since multiplayer games can be played against real people anywhere in the world or against the computer, which means that the multiplayer games can be played at any time [26], anywhere and by anyone, upgrading the complexity of human interactions and forming large communities in an expanded and more complex socio-cultural context.

Malone and Lepper [41] presented a theoretical framework with the important factors which create intrinsic motivation in games. According to their framework, intrinsic motivation includes four individual factors (challenge, fantasy, control and curiosity) and three interpersonal factors (cooperation, competition, recognition) (Figure 3). These factors have considered being important for developing motivating and appealing games.
Thus, the findings of the research, as presented in this chapter, concluded that there is a strong connection between intrinsic motivation and the sense of belonging in a group, created in MMOGs according to the relationship:

\[
\text{Sense of Community} = 1.234 + 0.427 \times \text{Intrinsic Motivation} + 0.188 \times \text{Game Performance}
\]

Therefore, the framework that Malone and Lepper suggested can be reformed in the one presented in figure 4.

Figure 4. Intrinsic Motivation in MMOGs

The new dimension for creating intrinsic motivation in MMOGs can be used for designing Educational Multiplayer Games that could develop the next generation skills that the MMOGs foster and the new generation of workers should acquire. These games should be designed to be motivating for learners, taking into account personal and interpersonal factors such as intrinsic motivation and the development of a sense of community in a game, in order to enhance skills and performance.

It seems that MMOGs could be a good model for developing motivating educational online games for training large communities of players, where information sharing and collaboration contribute in authentic practices and social interaction, in a situated learning environment.

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