Classroom Multiplayer Presential Games

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Abstract—Given the promising results of massively multiplayer online games (MMOGs) for educational purposes, this paper maps the essential concepts behind MMOGs, into the classroom context. Since the number of students in this context is not massive and play takes place within a single room rather than on the Internet, we have changed the terms “massively” and “online” to “classroom” and “presental” respectively, thus giving us the new designation “classroom multiplayer presential game” (CMPG). We present the development of a CMPG for teaching concepts of ecology as laid down in the teaching objectives defined for a 6th grade course by the Chilean school authorities.

Keywords: learning, classroom, multiplayer game, MMOG, virtual worlds

I. INTRODUCTION

The development of Information and Communication Technologies (ICTs) has enabled a new era of video gaming and their potential in the classroom. For instance, the principal investigator started by studying how video games [1], could be used in the classroom [2]. Then, the idea was to see how small group collaboration could be introduced in the classroom [3]. Within these, different aspects were studied. Among others we considered, open ended problems [4], the use of robots as mediators [5], teacher training issues [6], technology transfer issues [7, 8], methodological issues [9], software issues [10], network issues [11], formal aspects [12] and how multiple users could interact with their personal input device on one machine with one display [13, 14].

ICT has improved and supported various teaching practices and has allowed new instruction methodologies to be developed. These new teaching practices, inconceivable without the current development of ICT and related infrastructure, provide for unique scalability, collaboration and careful automated assessment that a few years ago was only discussed in science fiction [15, 16].

ICTs in the classroom can be related to the dynamics of the discipline itself. On the one hand, it has been noted that digital presentation technologies (for example, PowerPoint) can not only be used as a tool for exposition purposes, but also even as a tool for guiding the students’ learning process, by clearly assisting the creation of dialogues and argumentation both among students and between students and the teacher [17]. On the other, technologies such as the instant messaging system (SMS) have allowed the development of Prompting Systems, which expedite students’ putting forward questions to the teacher, thus introducing orderliness in this process, increasing student participation, and giving students greater freedom to put forward their questions [18].

A determinant of ICTs is their ability to create an interconnected classroom in which each student can relate with his/her classmates, sharing information and obtaining support in solving tasks and exercises. An example of this is the use of wireless Tablet PCs, which are used by students as interconnected exercise books through which they can share information and as an exercise book for group task solving [19]. This interconnection has also provided for supporting and strengthening collaborative work during the class. In this way, technology has provided for checking and monitoring interactions among students, and has made it possible to regulate tasks, rules and roles, and mediate the acquisition of new knowledge [20] both in small work groups [21, 3, 22, 23] and in the whole class [24, 10].

When students within the classroom are interconnected and support their work and communication with ICT “Participatory Simulation” is possible. Students engaged in participatory simulations act out the roles of individual system elements and then see how the behavior of the system as a whole can emerge from these individual behaviors. The emergent behavior of the system and its relation to individual participant actions and strategies can then become the object of collective discussion and analysis [25]. Participatory Simulation allows learning while doing; students are collaboratively engaged in the actual simulation joining the virtual world where the simulation occurs [26] favoring the immersion process in the learning situation [27].

ICT has brought a revolution in the gaming world. Worldwide, interconnection has allowed the development of massively multiplayer online games (MMOG). These games have been studied mainly in relation to their social, individual, narrative and playful aspects [28]. With regards to users, different styles of gamers have been found such as the following, among others: committed players, sporadic players, individualist and community players, players who consider their role in the MMOGs as part of their life rather than as a game, and players whose sole purpose is to break the established rules, taking pleasure in pestering the rest of the players [29, 30, 31]. It has also been observed that these games are attractive for users of both genders [32], across a wide age range (11 – 68 years) [33], with motivation components being based mainly on achievement, social relationships, and immersion [29, 33, 34]. With regards to the variables that shape these games, three fundamental aspects of these virtual worlds are interactivity, realism, and persistence [35]. Additionally, a particular feature of these games is the fact that they lack a given objective; on the contrary, participants enroll in the
given the promising results, grade course in nature study and teaching ecology. The teaching objectives of the game are aligned with the ones laid down by the Chilean Ministry of Education. The activity language will be games; the social setting collaboration; and children will learn by doing through participatory simulations. Given the promising results of using MMOG technologies for educational purposes, this work translates the multiplayer role playing game (MRPG) aspect, the essential concept of MMOGs, into the classroom context. Since the number of students in this context is not massive and play takes place within a single room rather than on the Internet, we have changed the terms “massively” and “online” to “classroom” and “presential” respectively, thus giving us the new designation “classroom multiplayer presential games” (CMPG).

This game type involves all of the students in a class playing at the same time in a virtual world projected onto the walls of the room in which each student interacts through an individual input device (mouse).

The essential contribution of MMOGs to interactive learning environments is their support of intrinsic motivation. The main factors found to lie behind this phenomenon are a player’s character in the narrative and the quest model. The narrative is the game’s background story, made up of a series of mini-narratives known as quests. Quests provide information to players moving through a world and when they need it, supplying indications on its meaning and how it applies to that world.

III. CMPG FOR TEACHING ECOLOGY

The previous CMPGs concepts are being validated in teaching ecology. The teaching objectives of the game are the ones laid down by the Chilean Ministry of Education for the 6th Grade course in nature study and comprehension.

The ecology game includes a number of different quests following the CMPG model, each one designed to emphasize a key teaching objective. They are arranged linearly so that the end of one marks the beginning of the next. This order is determined by the curriculum structure set by the Ministry of Education and ensures that the course concepts are delivered incrementally.

In the first quest, explosive growth in the population of deer reaches plague proportions. The players must collaborate to prevent these herbivores from wiping out all vegetation and destroying the ecosystem. In the second quest, a foreign species enters the ecosystem and feeds on vegetation and destroying the ecosystem. In the third quest a strange parasite appears, setting off an epidemic that effects the animal population. The players must contain and eliminate the new species predators that were previously at the top of the food chain.

The processing is managed on a sole PC with a single graphics output device and multiple input devices to allow interaction between the student players. This was achieved using Microsoft Multipoint SDK, which supports processing independently of the information captured by the devices. Thus, each player can have his or her own pointer controlled by a mouse in order to interact.
with the system. Among the benefits of this single-computer design are its low cost and portability compared to a setup using separate machines for each player, which would require multiple computers in a dedicated room.

The game can support a maximum of ten players. This is due mainly to the space restrictions within the virtual world given that the players’ characters must be displayed on the same output device, thus limiting visible space. The larger is the number of elements in the game, the more difficult it becomes to distinguish between them, and since the players themselves are elements their number must be restricted.

IV. CONCLUSION

The presented work shows how the classroom can be transformed to one where students are active participatory learners using collaborative game technology. In this way the first M (Massive) of MMOG is transformed into C (Classroom), and the O (on line) for P (presential), transforming MMOG in to CMPG.

The presented CMPG concepts are being extended. The first is the presented model but spread to the whole classroom to allow all students participate simultaneously. In this case, the virtual world is constructed with multiple video projectors, one for each classroom wall, where kids interact with each other face to face and with the virtual world with a wireless mouse, or eventually a Wii control. In the second one, the virtual world is constructed by augmented reality. Here, each kid has a Tablet CMPC (netbook) where with the camera looks to the surroundings where the virtual world is constructed, and interacts with their peers face to face and with the virtual world through their personal device. Considering that in a participatory technology mediated classroom we can establish the social network, where group members interact in person, and the technological network, that coordinates and synchronizes activity states mediating the activities and the peers’ social interaction, our future work is to study, by comparing both proposed approaches, how the different technological networks influences the social network and learning.

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REFERENCES


