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## How to bring immersion into Learning Games?

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### Abstract

*Learning games are interesting environments presenting factual advantages. New usages emerge for learning and we need to consider them for the design of these games. Collaborative support, observation capacities and immersion are aspects that are directly linked with these learning environments. In this paper, we focus on the “immersion” feature and we propose some guidelines in order to take it into account as much as possible while designing an educational game. In order to illustrate our purpose, we present a learning role-playing game “World of SeRéCom”<sup>1</sup>.*

### 1. Introduction

Nowadays, compared to traditional teaching methods, Learning Management Systems (LMS) offer functionalities that are recognized as being valuable from different points of view. For instance, students can learn at their own speed. However, although they enable powerful features, they also receive major kinds of criticism (lack of awareness, few collaborative or regulation possibilities, unexciting).

Agreeing with Vygotski’s school of thought and activity theory [1], we consider that enhancing the social dimension in such environments is crucial.

Observing the emergence and success of online multiplayer games with our students, it was decided to experiment our own learning game approach, by developing new games and by using it as a support for some learning sessions [3].

In this article, we will first set out a way to transform these LMS into more attractive software such as learning games and we will focus on the concept of immersion that is fundamental in keeping coherency between the pedagogical content and the game itself.

### 2. Advantages of Learning Games

Acquiring knowledge during a learning session is to some extent similar to following an adventure in a

Role-Playing Game (RPG). This approach reveals advantages such as a recreation-type process, a large usability of the tool or its adaptation to the student’s speed. Such game-based learning environments can thus be proposed as a way of implementing learning sessions, in which teachers can prepare and follow a pedagogical scenario [2].

#### 2.1 Link between Pedagogical Sessions and RPG Games.

In order to link the game world to the learning one, we propose in this section to link the objects used in a game-based framework with the concepts that we usually find in a learning system. Table 1 summarizes these links.

As seen in this table, most of the concepts can be easily represented in such a game. Other advantages may be considered from a collaborative viewpoint.

#### 2.2 Collaborating via multiplayer games

As a matter of fact, another advantage of such an approach is that students – the so-called “digital natives” are quite familiar with online games and they immediately know how to progress in a learning environment [4].

Classical concept in the activity theory	Corresponding representation in our RPG-Game-based LMS
Arena / Collaborative space	Map and Environment Design Location / specific part of the map
Link between activities	Access to new locations
(sub) Activity	(sub) Quests, enigmatic objects (scrolls, bribe, etc.)
Condition / Requisite	Conditional access
Resources	Objects or NPC <sup>2</sup> found in the game
Assessment, Validation	Rewards of a quest (objects, access to new places)
Communication tool	Chat window
Actors	Players (students, possibly teachers), NPC

<sup>1</sup> This work has been performed in the Learning Game Factory FEDER project (European Funds for Régional Development).

<sup>2</sup> NPC = Non-Player Character: person played by the AI -Artificial Intelligence (scripts).

Learning progression	Characteristics of the player, objects owned
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Table 1: Correspondence between AT Concepts and RPG-Game-based LMS Representation

Such games facilitate the exchange of data between students, making them ask questions, co-resolving a problem. As in “traditional classrooms”, a student may also collaborate with a teacher inside the game, for instance if s/he needs help from her/him.

### 2.3 Observing a learning rpg-game session

Another fundamental point in LMS has to be adapted to learning games. The teacher no longer has the usual and helpful student feedback (eyes, general attitude) [4].

Concerning this point; for usability purposes, it is essential that Computer-Based Education offer the possibility of monitoring the learning progression performed by the students and of obtaining information or feedback about it.

RPGs focus on the player and her/his evolution in the game. It is therefore rather easy to implement this awareness functionality concerning the learning progression through the personal characteristics of each player. Nevertheless, even in recent learning games, the whole game design is not linked to the learning concepts. Therefore, students/players do not feel immersed in a world that is coherent for them.

## 3. Immersion in Learning Games

Immersion is devoted to several concepts that can be found in many studies concerning video games [5] [6].

Immersion is a key point for motivation and collaboration in the game. There is also another aspect that must be considered: when students learn something in a game, they need to **transfer** the acquired **knowledge** to real life. If the game includes elements that match the real situation, this transfer will be simplified. With this view, we would like to give some guidelines (indicated by *Gi in italics*) in order to take into account the immersion feature as much as possible while designing the educational game. We have chosen to focus on 3 concepts that can be generally found in classical video game theory: Game Design, Game Play and coherent metaphors.

### 3.1 Game design

A learning rpg usually proposes to transfer the student to a virtual world. From our point of view, a well-known, consistent and coherent environment, similar to established famous games or styles of game (Mario World, Final Fantasy) will help the students to immerse in the game. Many references, clues or jokes

added by the game design are useful to enhance this aspect. The idea is to provoke the desire to go further, to explore the world and find other funny or pleasant references.

***G1: Develop a coherent world. For cost reasons, it may be helpful to reuse the look and feel of well-known games.***

The game design also deals with the map of the game. In order to make links between the real and the virtual worlds, this map should correspond as much as possible to the real premises where the learning sessions usually take place (classrooms, buildings).

***G2: Find the real places or people usually involved in the learning process that you would like to integrate into the game. Think of “funny little stories” that are part of the learning context.***

Concerning the educational domain, it is even more important to focus on the game play.

### 3.2 Game play

The game play may be understood as the set of rules of the game [7]. Here, the idea is to create a surprising effect by changing the rules both with the educational domain and the game. For example, when we first experimented our learning game, our students were surprised to be together in the same game world, to see their friends’ actions and to be encouraged to exchange ideas in the game with a chat tool [3].

***G3: Design an overall pedagogical scenario, a story, taking place in the premises defined in the game design.***

Again, we need to show explicitly that this game is adapted or designed for the particular actors that will learn in this environment. The quests, the designed objects / NPC should have an explicit reference to the corresponding ones in the real world. One of the most successful examples is to bring the teacher directly inside the game and give the possibility to the students to interact (request some help) directly with her/him by chat. Other teachers (not directly involved in the learning process) may also be added as NPC.

***G4: Find which rules of the real world you need to reproduce in the game. Some can be there to improve the credibility of the virtual world; others are directly linked to the learning process (e.g. degree of collaboration allowed).***

### 3.3 Coherent metaphors

Generally, a specific world, often dream-related, is designed and used as a support for all the learning concepts. The result is that the game is filled with a pedagogical content not adapted to the environment of the game itself.

Metaphors are a powerful way of keeping a strong coherence in the environment, because the different learners can understand them easily. For example, concerning the general game play, a correct answer to an exercise can give the key to another place. The player is therefore not disconnected from the game

world by switching from the game to a specific learning feature.

**G5: Define metaphors linked with the general story (G3) and with the different learning objects.**

All these concepts have been enacted and experimented in a learning rpg environment, developed in 2008, which is partially used in our “SeRéCom” department at the university.

#### 4. The example of “World of SeRéCom”

The work presented in this paper arises from the results of our latest experiments with several learning games developed and experimented with students in our university, in real learning situations [3].

World of SeRéCom is a multiplayer rpg that we developed for students on a 2-year multimedia course (computer science, communication and graphic art) at our university. We illustrate here how the guidelines were applied during the design of this game.

##### 4.1 Obtaining a well-known environment...

The basic idea was to represent the whole content of this academic structure. We first decided to choose a “Zelda” style (G1) to have a well-known look and feel in the game. According to G2, we decided to have an accurate graphical representation of our institute of technology building, where the learning activities take place: The library (G5), the teachers’ offices and the classrooms are central locations that we decided to model. In the library, students find electronic versions of the course. In each office, classroom or moving in the map, some NPC represent the real teachers increasing significantly the immersion factor. (see fig.1). Each student connected is visible in the game and may be contacted by chat.

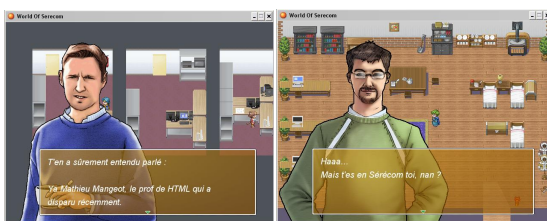


Figure1. Real teachers offer quests about their learning domain.

##### 4.2 Technical considerations and results

As stated in section 2.3, the user learning progression may be observed through his/her characteristics but also more easily for the teachers, via a website dedicated to the game and linked to a database. As in other learning environments, we plan to add collaborative indicators for the teachers [8]. The architecture is based on a heavy client on student machines and a light server.

Students were very enthusiastic to play this game but currently little learning content is available. Although they were very interested and immersed in exploring the world and particularly their institute, it is important to admit that we were not able to evaluate correctly the quality of learning with the first version of the game. Further experiments and developments are scheduled.

#### 5. Perspectives and conclusion

As stated previously, this environment is still being developed and will be aimed at representing the whole “SeRéCom” academic course.

With this rpg, we illustrated a way to integrate learning sessions deeply inside the game itself with a high level of immersion: the learning content is integrated both in game design and game play. Important features missing in learning games, such as observation of learning progression and collaborative facilities are taken into account.

Some drawbacks persist: well-integrated exercises are very time-consuming to develop: a satisfying metaphor must be found, then a learning content must be transformed into a game and next the design must be realized. We currently think that we can develop some specific generic bricks dedicated to a classical type of exercise. An interesting perspective could be to develop and propose to the teachers a set or a library of typical exercises.

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