



Serious Games For Reflective Learning

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Abstract

This paper describes a game application designed for care homes, hospitals and the civil protection and dealing with the topic “complex dialogues” in the frame of the MIRROR project. This project aims to empower and engage employees to reflect on past work performances and personal learning experiences in order to learn in “real-time” and to creatively solve pressing problems immediately. The designed game will be the first step to analyse how to motivate adult users to learn with games and specifically to foster individual as well as group reflection, self consciousness of users and to foster cooperation with a virtual or real tutor on a personal level as well as within a group of learners.

During the game described in this paper the users will have the possibility to experience scenes of daily life at work and choose between different behaviors. Whenever they feel it is relevant, they can record their moods through a so-called “mood map”, based on the “Circumplex model of affect” (Russell J.A., 1980). This allows to capture data useful to understand the emotional impact of the serious game and of the covered topics and reflect on them. At the end of the game the users can self-evaluate their behavior based on a set of predefined parameters, and only after receiving a feedback coming from the system, they will see the discrepancy between their self-perception and how they actually behaved. Finally, in order to foster reflection, users will be able to review the choices made during the interaction with the serious game seeing in addition the reactions and thoughts of their counterparts. Preliminary results of users expectations and experiences are reported and an outlook on further steps is given.

1. Introduction

Serious Games are indisputably quickly conquering their space within technology enhanced learning solutions as high-value tools for an effective and appreciated experiential learning even at the workplace. However there is still a lack of scientific evidence of how serious games relate to reflection, which is one of the pillars for learning.

This paper describes a serious game application designed for care homes and hospitals, dealing with the topic “complex dialogues” in the frame of the MIRROR project, as the first application to start investigating how adults can be motivated to learn and reflect with games.

2. The Mirror Project

“MIRROR-Reflective learning at work” is a Seventh Framework Programme project with the aim of pushing human resources to reflect on previous experiences at the workplace and learn from it. The focus of MIRROR is the creation of a set of applications (“Mirror apps”) that enable employees to learn lessons from their own experiences as well as experiences of others to perform better in the future. A prerequisite for exploring innovative solutions in this context is to rely on the human ability to efficiently and effectively learn directly from tacit knowledge, without the need for making it explicit. Specifically MIRROR will provide the following outputs:

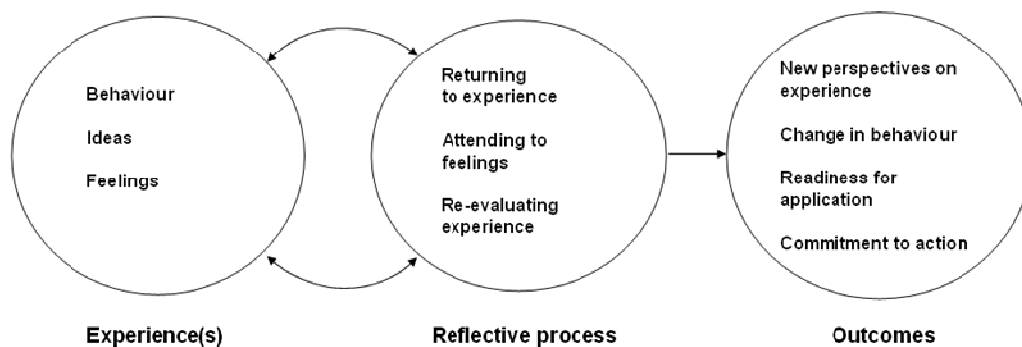
- a conceptual model of holistic continuous learning by reflection which incorporates the essential ingredients of training critical thinking, awareness of emotions, collaborative knowledge construction, creative problem solving and innovation;

- a bundle of real-time, interoperable learning applications that can be used within the collaborative and social work environment of the employees;
- a prove of learning effectiveness through evaluation within different test beds.
- Thanks to these main objectives, MIRROR will be the first technology-enhanced learning approach that can be used in highly dynamic working situations where no teachers, no formal content, and no explicit knowledge are available.

Before describing the serious game that is being developed in this context, it is important to underline what the term “reflection” and specifically the concept of “reflection at work” mean in this context.

2.1 Reflective learning at work

The understanding of the process of reflective learning, in the frame of the MIRROR project, is based on the model of Boud et al [1], in which the learner re-evaluates past experience by attending to its various aspects (including affective ones) and thereby produces outcomes.



(Fig.1. A model of the reflective process, Boud et al, 1985)

According to this model, a key aspect in making a reflective process happen is the presence of triggers that can be defined as unexpected situations, e.g. disturbances and perception of uncertainty but also positive situations like surprising success. In general, reflection seems to be triggered by awareness of discrepancy between expectations and the current experience. Specifically this process might be triggered by an external event or agent or might develop from one’s own thinking of a whole series of occurrences over time as an inner need to reflect. Furthermore reflection can occur incidentally or intentionally, but most authors [2] agree that in both cases reflection is a conscious evaluation of experience that leads to a better understanding of the experience and allows for drawing conclusions that guide future behavior. Of course, in order to reach this level, learners need to develop the ability of generalization and abstraction from concrete experience.

Moreover reflection can take place individually and collaboratively [2], either of which provides certain advantages and disadvantages and entail different needs of support. For reflection to be collaborative, the participants need to share experiences and relate to experiences of others in their own reflection. The different characteristics of individual and collaborative reflection typically make it useful to combine the two in workplace learning. The main consequence of learning taking place in individuals and teams is reflective learning on the level of the organization. In this case e.g. reflection can be performed by management in order to improve organization’s performance. For all these reasons the outcome of reflection can include cognitive, affective, and/or behavioral consequences.

3. Serious games for reflective learning

Today a consistent and generally accepted definition of the term serious games has not been agreed upon yet. However, in general we can define a serious game as an interactive simulation which has the look and feel of a game, but is actually a simulation of real-world events or processes. As a first representative, Abt [3] writes in 1970 of “serious games in the sense that these games have an explicit and carefully thought-out educational purpose and are not intended to be played primarily for amusement”. Although in this definition, the entertainment aspect is put in the background, it is not said that Serious Games must not be entertaining [4]. An approach which most notably accommodates the idea of gaming and already describes the potential areas of application of Serious

Games comes from Zyda [5]. He defines serious games as 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”. According to this definition the main intent of a serious game is imparting knowledge or skills through direct experience of carrying out a task (“learning by doing”). Furthermore, serious games can support contemporary learning activities and foster intellectual growth [6].

Thanks to these researches it is possible to understand why, in the last years, the use of serious games has become increasingly popular. In general, in fact, a serious game has always one or more of the following main goals [7]:

- train and educate
- inform
- change attitude and behaviour.

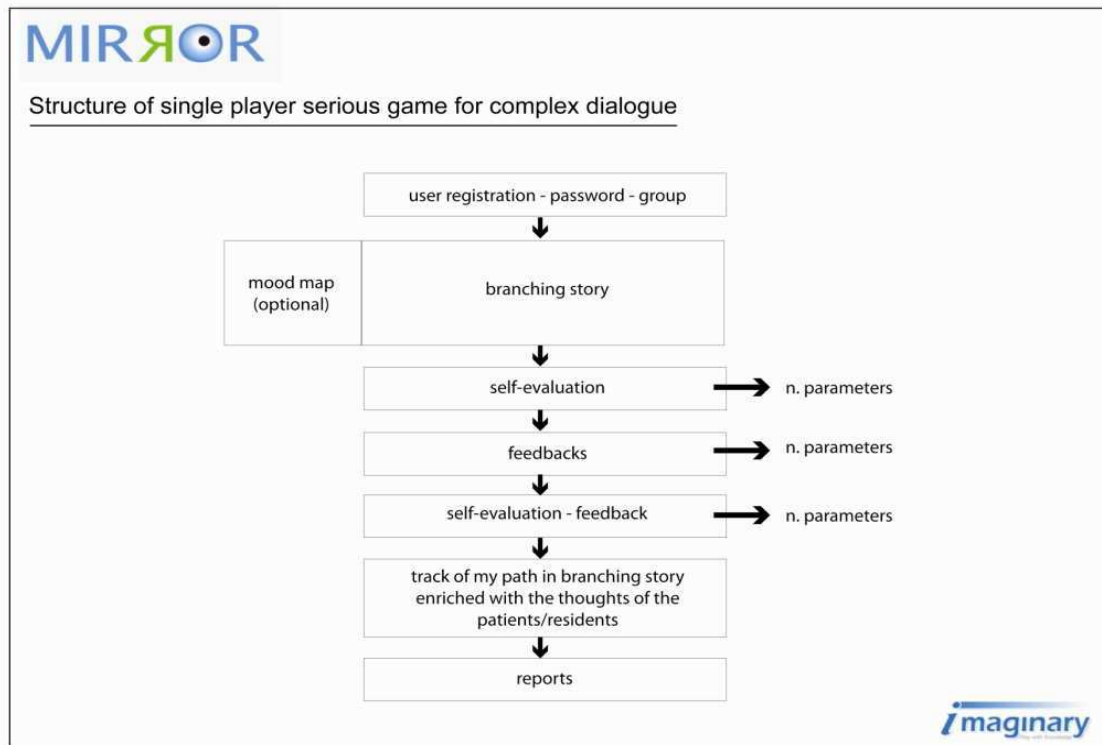
Furthermore, some key aspects are very important to understand how serious games could be considered as a new important way to support reflection [8]:

1. A simulated environment, system or a realistically recreated role play scenario can allow learners to experience something that is too costly, too risky or even physically impossible to achieve in the real world.
2. Repeatability is also a key strength of a game or simulation-based approach. Learners can play out a particular strategy or adopt a certain approach. If they fail or do not quite deliver the desired outcome, then they can try again with a modified approach.
3. A serious game has to be considered as an experience. Games engage people psychologically (they can be very emotional experiences) and also physiologically.

For all these reasons, serious games can be considered a useful way to trigger and support reflection. However there are no scientific evidences about the relationship between serious games and reflective activities so far.

3.1 The first MIRROR Serious Game

According to these theoretical backgrounds, in the frame of the MIRROR project a first serious game to foster reflection in learning and around learning at work was developed. While playing this game about “complex dialogues”, users have the possibility to experience scenes of daily life at work and choose between different behaviors. Nurses in a hospital as well as carers at the care homes will have to deal with different patients, choosing how to react to strange requests and how to balance their time and interventions among concurrent calls and needs. Here the dialogues are represented in form of a branching story where the player must choose between different options, which are never obvious or evident. The next scene is determined by the previous choice and sometimes randomly picked from a poll of possibilities, to make the user engage with the story even when playing again.



(Fig.2. Structure of the MIRROR Serious Game about complex dialogues)

The previous picture shows the structure of the game, into which a “mood map”, based on the “Circumplex model of affect” [9] was introduced. According to this model, emotional experiences depend on two major dimensions, the degree of arousal and the degree of pleasure. During the game, whenever users feel it is relevant, they can record their moods through this tool that allows to analyze users behaviors and their motivation, as well as to get some more inputs for reflection after the exercise is completed.

After playing users will have to do a self evaluation, based on pre-defined parameters (Patient satisfaction, Quality of response, Response in relation to the patient , Time management) to state how they think they have performed. A feedback based on the same parameters comes then from the system and a spider-web graph comparing the two is displayed. Finally, in order to be able to better reflect on the differences and on the experience, users will be able to review the dialogues, where the thoughts of the counterpart are shown as well.

This structure contains different elements which facilitate the reflective process:

- through feedbacks, users can check their behaviour during the game experience and reflect on it;
- with self-evaluation processes users are motivated to reflect on their actions and reactions during the game;
- the possibility to see the thoughts of the counterpart allows users to compare different points of view;
- through several data, e.g. coming from the mood map, users can check their behaviour and reflect on it;
- final reports facilitate users to reflect on the whole experience they had during the game.

Together with this context-specific, highly realistic game, some other serious games with “transversal topics” will be introduced to the same adult users, to investigate their motivation to learn and reflect with games. Results of users expectations and experiences will be reported during the conference.

4. Conclusions and Outlook

In conclusion, the described game is the first of the several gaming apps that will be developed in the frame of MIRROR. Ideally the roadmap foresees to end with the realization of a virtual environment (virtual care home, virtual hospital), hosting several game apps, characterized by:

- Exciting graphics

- Missions with objectives to be achieved
- Obstacles to be overcome as tests to move up levels.
- Tasks to be completed resulting in accumulation of goods/resources/professional knowledge and understanding, which are required to pass the test and move up a level.

Such a virtual environment would be 'explorable' and different game-based games apps will be activated in different places according to local circumstances. This whole environment will serve as the base to research further how serious games relate to reflection and can serve as a trigger for it.

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