Ne(x)t Generation Skills and E-learning: A Self-Regulation Script Applied in Second Life

Fotini Paraskeva¹ and Sofia Mysirlaki¹

¹ University of Piraeus, Department of Technology Education and Digital Systems, Piraeus, Greece

Abstract—Acknowledging the need for designing e-learning environments that would enhance the development of ne(x)t generation skills, we propose the use of Virtual worlds, such as Second Life, as more than an emerging trend in e-learning training programs. We suggest that Virtual Learning Environments (VLEs) could be interesting instructional tools that would meet the needs of modern training for the ne(x)t generation, delivering and reflecting in action the new learning experiences of professional knowledge, skills and values in the workplace. Extending previous research on ne(x)t generation skills and the impact of personal factors in enhancing human performance, such as Self-Regulation (SR) skills, and acknowledging the lack of theoretical foundations based on interdisciplinary perspectives of computer science, instructional design and learning psychology for training, we design e-learning courses based on Self-Regulation learning theory using the virtual environment of Second Life to enhance situated experience in professional and career development. As a result, we present an educational script and its components, in order to describe the structures of interaction that we use to design learning activities that would enhance self-regulation skills in a VLE. This script is used as a tool for conducting experiments in e-learning courses, studying the design, development and evaluation of the collaborative learning process in Second Life.

Index Terms—E-learning, Next Generation, Second Life, Self Regulation

I. INTRODUCTION

E-learning has profoundly changes many aspects of the society in educational programs, in business, in economical fields etc. The e-learning programs draw a wide range of disciplines and skills from different scientific fields, in which the learners have to manage the materials and situations of the new e-learning environment. This new experience presents challenges since learners often have to handle the ambiguity and vagueness of the new various learning environment, based on interactive technologies. The interactive technologies can play a significant role in engaging the learners’ with the new role, providing a rich learning environment.

In this environment factors such as different disciplinary approaches (computer science, educational psychology, education), with emphasis on the resources, on the collaboration and on personal indexes seem to influence learners’ engagement in the use of the interactive technologies in academic continuing performance. The e-learning programs can cover different delivery methods of teaching, ranging from face to face courses to online courses (LMS, VLE, CoP, mLearning technologies, forums).

Based on previous research [1], we had examined factors such as self-beliefs (self concept, compute/self-efficacy) and self-regulation as important contributors to the learning process in enhancing human performance. Despite the significant positive relationships that were revealed between learner characteristics, such as self-concept (academic achievement and job achievement), Computer Self Efficacy (CSE) and Self-Regulation (SR) constructs, these factors have received little attention in the design of e-learning environments. Therefore, we argued that e-learning environments should include tools and practices that would promote efficient procedures of learning and self-regulated strategies that would enable learners to manage their own learning in the workplace.

Moreover, the high dropout rate of e-learning is linked with low rates of self-motivation and self-direction in e-Learning [2]. Acknowledging the need for designing e-learning environments that would enhance the development of self-regulation skills, we propose the use of Virtual worlds, such as Second Life, for supporting well-designed self-regulated scenarios and strategies.

This paper presents an educational script that was used to design learning activities that aim to develop self-regulation skills, in the Virtual Learning Environment (VLE) of Second Life.

II. THEORETICAL BACKGROUND

A. Ne(x)t Generation skills

It is common ground that 21st century people require a different set of skills in order to cope with the complexity and the faster pace of life, than people in the old days did. 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:
- 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 and having the “ability to learn from unforeseen situations and circumstances.” [5]

Nowadays learning 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 [6, 7]. As our need for collaboration grows, so too have the tools that
connect us in social networks and support the creation of online communities [8, 9].

It is claimed that 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 [10]. 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 [11]. The modern world requires that knowledge not be limited to one individual’s thinking, but rather shared and accessed in a variety of ways.

“Ne(x)t-generation”, is a term that is used to describe the people that grew up with Information and Communication Technologies (ICT), having a whole different set of needs and skills than older people had. This term stems from the term “Net Generation”, coined by [12], used to describe the generation that grew up immersed in a digital--and Internet--driven world. Since then, different terms have been used to describe this group, such as ‘digital natives’ [13], ‘millennials’ [14] or Google generation [15]. This new generation of people, such as users of online games and Virtual Worlds, are spending thousands of hours rapidly analyzing new situations, interacting with characters they don’t really know, and solving problems quickly and independently [16], and therefore developing ne(x)t generation skills.

We argue that educational environments should aim at developing these needs in order to train 21 century skilled people. Nevertheless, it is striking that many people today are not acquiring these skills through structured learning environments that anticipate these needs, but rather through various “cognitively-demanding leisure” activities they choose to engage with, including to a larger and larger extent, videogames [17] and virtual worlds, such as Second Life. Stemming from the need for developing next generation skills, education needs to be reformed since as Marshal McLuhan once said “Our age of anxiety is largely the result of trying to do today’s job with yesterday’s tools”. According to that, innovative tools, such as 3d environments and virtual worlds, are maybe just what we need to teach the new generation 21 century skills.

B. Self-Regulation Theory

Self-regulated learning (SRL) is an active process, whereby learners set goals for their learning and then attempt to monitor, regulate, and control their behavior (motivations, self-beliefs, cognitive and meta-cognitive strategies, self-management) in order to guide their goals to their performance in the environment [18].

Most theories of self-regulation emphasize self-development, motivations, goals and achievements. Motivation helps people focus on the task, select and apply appropriate strategies, and monitor goal progress. Goals enhance self-regulation through their effects on motivation, learning strategies, self-efficacy, recourses management and self-evaluation of progress [19, 20].

However, there is a question that needs to be answered: “what happens when learning takes place in an e-learning environment rather than a traditional classroom?”. It is claimed that in order for computer-based learning environments to be effective, learners must be self-regulated [21]. It seems that in computer mediated environments learners must have Self-Regulation skills to level the absence of motivating and supporting factors such as group pressure, familiar learning situation, and social factors [22]. Therefore, e-learning environments should provide Self-Regulation strategies in order to maximize learners’ engagement to an e-learning course.

In addition, the latest shift of educational technology to collaborative e-learning environments calls for a redesign of Self-Regulated instruction. Collaborative learning seems to support self-regulation “because peers model and discuss their own learning and motivation strategies, which are then “distributed” across the group for individuals to pick up and modify to suit their own needs” [23].

III. A SELF - REGULATION SCRIPT APPLIED IN SECOND LIFE

Second Life [24] as an online virtual world environment is tapping with the issues of social, behavioral, economic science. All of these issues are also respectively treated in computer science.

Second Life, as a communicative environment, has multiple potential uses in learning and teaching. In this environment people can work and interact in a realistic manner, moving as participants from a passive to more active roles [25]. In this environment the educators, as well as students, can create avatars that represent them in a virtual space. The avatars can interact with each other, objects and the related environment [26].

After an initial enthusiasm, by educators for using Second Life as an educational tool, criticism and scepticism about teaching in VLEs has emerged about the effectiveness of the Second Life based on scenarios, events, activities, and role-playing, while critics have argued that these environments may be more a game-play than pedagogical [27]. Undoubtedly, the potential role of Second Life could assist an educational setting, but this role is still being constructed under solid and interdisciplinary theoretical backgrounds.

In order to overtake these arguments and scepticism of Second Life in the field of educational psychology, we argue that the instructors could use Second Life as a space to meet with students, creating educational content, in which they could develop skills and other capabilities. Students’ engagement with the content and the sense of community within the environment could be enhanced using interactions, collaborations and regulations within Second Life. We suggest that instructors using Second Life can formulate clear manners to build communities by objectives, starting with an application of an educational theoretical background (scenarios, strategies,
roles, activities) and involve students in designing and assessing learning activities in the virtual environment.

We argue that Second Lifes’ use, as an educational tool, is still in the early stages of the process of learning, including critical factors such as self-regulation skills. These factors tend to be more important for educators and learners in the Second Life environment, in order to manage their own learning (as self-control, self-monitoring, self-management procedures in learning). In this direction we propose an educational scenario based on self-regulated learning theory.

The proposed scenario exploits the 3d environment of Second Life and aims to develop the 21st century skills, such as collaboration, team work, peer exchange, problem solving skills etc, following the self-regulation theory, in order to provide a framework for developing activities that would enhance self-regulation skills. This scenario is described according to the Kobbe/Kaleidoscope framework, which identifies a script’s components as the individuals that participate in a script, the activities that they engage in, the roles they assume, the resources that they make use of and the groups they form [28].

A. The Script Components

Resources: We utilize a 3d environment in Second Life (SL) in such a way as to foster collaboration and discussion among students, allowing interactions that can be captured and analyzed by using log files. The SL offers a variety of communication possibilities via chat, email, forum and nonverbal avatars’ communication. This environment also, supports presentations resources, such as Videos and Simulations, e-books, articles and assessment resources, such as portfolios, in order for trainers to keep a record of their work. This 3d environment has the ability to embody a variety of resources depending on the trainers’ needs (new activities, exercises or tests).

Participants: are the users of the script. An even number of at least 4 participants and a tutor, and at least 2 participants are needed for each group. There should be at least two groups participating in the script.

Groups: The participants can be grouped according to various criteria, such as former knowledge, during the script. The script’s groups are small groups of 2 people.

Roles: The main function of roles in collaboration scripts is to refer to specific participants when assigning activities or allocating resources. The script’s roles are the Group Participant, the Individual Learner and the Moderator. The Moderator is a trainer who promotes the collaboration of the trainees, who summarizes a conversation and interferes when something is not correctly understood. An Individual Learner is someone who does not belong in a group and acts on his/her own. The Group Participant belongs in a group and acts according to the groups’ decisions.

Activities: The learning activities are the building bricks in a pedagogical scenario. For the creation of the script we used activities that are described in the DialogPlus Taxonomy for each of the scripts’ phases. In the Forethought Phase the activities are: Viewing, Discussing, Analysing, Modeling, Gathering, and Classifying. In the Performance Phase the participants of the script act by: Viewing, Practicing, Modeling, Discussing, Creating and Presenting artifacts. Finally, in the Self-Reflection Phase the acts are: Reading, Gathering, Classifying, Creating, and Discussing.

Group formation & component distribution: The groups’ size should be 2 people, the desired amount of groups about 10 and their group composition should include males and females, as well as expert and novices.

Sequencing: Based on the main features of the Self-Regulation theory [29, 30], the self-regulated learning strategies that will be used, in order to design the script’s activities in each of the self-regulation phases, are described in Table I.

<table>
<thead>
<tr>
<th>TABLE I. SELF REGULATION PHASES AND LEARNING STRATEGIES</th>
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<tr>
<td><strong>Self Regulation Phase</strong></td>
</tr>
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| Forethought Phase | • Introsic interest  
| | • Goal Setting  
| | • Modeling  
| | • Keeping records and monitoring  
| | • Planning  
| | • Task analysis  
| | • Strategic planning  
| | • Rehearsing and memorizing  
| | • Self motivation  
| | • Discuss outcome expectations  
| | • Self-efficacy beliefs |
| Performance Phase | • Rehearsing and memorizing  
| | • Self-control  
| | • Keeping records and monitoring  
| | • Self-instruction  
| | • Self – observation  
| | • Self-recording  
| | • Seeking social assistance |
| Self-reflection Phase | • Self-Evaluation  
| | • Self-monitoring  
| | • Self-Judgment  
| | • Self-–Reaction  
| | • Strategic planning  
| | • Reflective Thinking |

Based on these phases and strategies we propose a framework for self-regulation scenarios presented in Fig.1 (Some of the complex activities, which are presented in the dark grey boxes in the previous figure, are analyzed next to the main framework).
Based on this template, we further applied the framework for self-regulation scenarios in Second Life [31].

B. Script’s Application in Second Life

According to the self-regulated learning strategies described above, the sequence of activities scripted in each phase of the scenario and applied in Second Life (SL) is:

1. ‘Forethought’ phase: At first, the goal is to increase the participants’ intrinsic interest. Thus, the class moderator initializes the didactic problem by presenting some picture, video or story that students can relate with. The participants view and discuss the presented picture, video or story in order to generalize a concept that introduces the problem. Next, the moderator presents something to introduce the actual problem, and the whole class discusses the problem. The next sub-phases are team division, goal setting and problem definition.

   Team Division: The teams are divided in SL, by using random selection; color based grouping techniques or by using scripts for random selection and grouping.

   Team Work: Seeking social assistance
   Creating problems

   Reflective Thinking: Relate the problem and its solution with the real-world

   Self Judgement: Self-evaluation
   Self-reaction
   Strategic planning
**Problem Definition:** The problem definition and the submission of the proposed solutions are products of collaboration in SL.

![Figure 4. Problem Definition in Second Life](image)

**Modeling:** The demonstration/presentation of steps and methods for the resolution of problem are a basic step for modeling a procedure. In Second Life a procedure is modeled by using presentation techniques (such as PowerPoint and video presentations).

![Figure 5. PowerPoint presentations in Second Life](image)

![Figure 6. Video presentations in Second Life](image)

**Team work - Solving the problems:** In this step, a group of people studies the presentations and search for resources (form of contacts-links and documents) in Second Life.

![Figure 7. Observation by the moderator and peers in Second Life](image)

![Figure 8. Team work in Second Life](image)

![Figure 9. Solving the problems in Second Life](image)

**Peer Exchange:** Second Life provides a variety of collaboration and peer exchange activities, such as Local chatting (public conversation), Instant messaging (private conversation), Notecards (document exchange).

![Figure 10. Peer Exchange in Second Life](image)

**2. ‘Performance’ phase:** In this phase the participants in teams practice what they have learned in the forethought phase and attempt to solve a problem by using the provided model. In this phase the trainees can seek social assistance and create their own problems, they can exchange the problems they have created and solve them.
Practice: The players practice what they have learned through role playing activities, in order to practice collaborating educational activities. These activities can be observed and evaluated by the moderator and peers, in order to provide feedback to the students.

3. ‘Self-Reflection’ phase: The first stage of this phase is self-judgment, in which students self-evaluate their performance, adjust their strategies (self-reaction), and plan their strategies for future practice of the modeled solution. This phase also includes self-monitoring and reflective thinking techniques, such as the reflection of the lesson procedure and the relation of the presented problems with real-world situations.

Self-monitoring: In Second Life, the participants have the ability to observe their virtual representation (avatar), since the usual use of the camera is behind and above the avatars.

Self-judgment: Evaluation in Second Life is based on scales of graded criteria (rubrics) and is a result of using SLOODLE, which is an Open Source project which integrates the multi-user virtual environment of Second Life with the Moodle learning-management system.

IV. DISCUSSION AND CONCLUSION

Extending previous research on ne(x)t generation skills and the impact of personal factors in enhancing human performance, such as Self-Regulation (SR) skills, we tried to answer the question ‘how can we enhance self regulation techniques in e-learning environments?’. This paper presents the application of a script that was based on self-regulated theory in Second Life, using this virtual world of Second Life to enhance situated experience in professional and career development. This paper proposes that the 3d learning environment of Second Life could be an effective and innovative educational environment for the development of self-regulation skills and 21st skills (such as collaboration, engagement, etc).

This paper could offer additional support to more recent researches that have begun to explore the importance of 3d and gaming learning environments in training and programs, in order to develop continuing professional programs especially at a workplace and career environment (synchronous and asynchronous communication and training). For future studies we stress the need for explaining how customization issues based on
interdisciplinary approaches of computer science, educational and learning psychology and instructional design are essential and effective in educational practice. Ad hoc we propose this framework for further implementation and evaluation.

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AUTHORS

F. Paraskeva is with the Department of Technology Education and Digital Systems (TEDS), University of Piraeus, Greece, as an Assistant Professor. (e-mail: fparaske@unipi.gr).

S. Mysirlaki is MSc student in TEDS of University of Piraeus and a teacher in primary education. (e-mail: smyrsila@unipi.gr).

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