Chapter 7
Game-Based Approaches, Gamification, and Programming Language Training

Serhat Bahadır Kert
Yıldız Teknik Üniversitesi, Turkey

Mehmet Fatih Erkoç
Yıldız Teknik Üniversitesi, Turkey

ABSTRACT

Programming language training is a process that necessitates the continuity of individual motivation and interest. Many of the students who are assigned to computer programming courses have a lack of motivation to engage in programming tasks. Computer games or in-class gamification activities which could provide the students an opportunity to get rid of the boring abstract coding, can be used as motivational tools for improving the effectiveness of learning in programming language training. In this context, the purposes of the chapter can be summarized under two titles: 1) In which ways computer games are used in and 2) how gamification strategies are adapted to programming language courses. Additonally, at the end of the chapter, authors gave a sample of an experimental gamification research that the academic and motivational effectiveness of game strategies were investigated in a ActionScript 3.0 course.

INTRODUCTION

Since the last quarter of the past century, unprecedented sociocultural change has taken place with the impact of technological advances all over the world. The economy, based on the manufacturing industry in the 1960s, gained a new dimension and evolved into a service sector based on information, knowledge, and innovation in the 1990s. The widespread use of technology in every field of society has an important role in the global economy and social structure. Especially in the last 10 years, the information technologies have been used in almost every segment of society for different purposes. In a world of rapidly evolving technology and ever-changing global challenges, the main aim of the education system should be to equip the new generation of students with knowledge and skills to meet the requirements of the new era.

DOI: 10.4018/978-1-5225-1034-5.ch007

Restructuring the education system in accordance with new developments and global changes is among the priority areas of structural reform for Organization for Economic Cooperation and Development (OECD) countries. Reforms to the education system for effectively preparing students for the requirements of the 21st century are of paramount importance. Levy and Murnane (2005) pointed out that it increases the need for a workforce that has 21st-century skills, such as expert and creative thinking, awareness of their own knowledge, complex problem solving, and communication in the labor market under the influence of globalization. In the context of these requirements, educators, academicians, and politicians in many countries encourage the improvement of "21st-century skills" as a core competence (Miles & Wilson, 2004; Silva, 2009). To be a global citizen and a successful employee, students have to know how to creatively and effectively solve problems they encounter in their daily lives and workplaces, and they need to know, analyze, evaluate, manage, and use information gained from various sources. Producing creative solutions are required by 21st-century youths to adapt to the constantly changing world with the emergence of new technology and to make them one step ahead of their peers. However, it is required that today's students think creatively, analyze critically, work collaboratively, learn consistently, and be within communication lines to be successful in today's society (Resnick, 2007). Moreover, communication and decision-making skills are so crucial to be an effective team member or leader. In this era where technology is at the forefront, creativity and productivity are the most important skills that individuals have. It is obvious to everyone that there are many skills that not only must be learned by new-generation students but also must be taught by instructors to succeed in the 21st century.

Regarding students in the new era, Blunsdon, Reed, and McNeil (2003) claimed that the learning experience is a complex, contingent, and multidimensional process, and in their study, they focused on three aspects of the experience, consisting of enjoyment, learning, and outcomes. In this study, a simple model was proposed to outlining the factors that affect learning outcomes. As shown in Figure 1, enjoyment directly affects both learning outcomes and learning itself. In a nutshell, if students' confidence and enjoyment level in the learning experience were increased, motivation and desire to learn would also significantly increase.

Games are one of the most important tools to make learning fun and motivating for new-generation students. Today's students are different from previous generations. They have different needs and instructional settings because they have different learning styles. These students have been exposed to new technology and digital devices such as cell phones, tablet PCs, social networking sites, blogs, e-mails, instant messaging, and computer games at a very young age. They spend a major part of their leisure time playing computer games or electronic devices. Prensky (2001) called these new-generation students as "digital natives" because they think and process information fundamentally differently from past generations, and they are "native speakers" of the digital language of computers, video games, and the Internet. He claimed that new-generation college grads spend less than 5,000 hours reading, and

Figure 1. Model "The learning experience" and "educational outcomes"