

Chapter 45

Towards a Role-Playing Game Procedural Dungeon Generation Strategy to Help Developing Working Skills

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ABSTRACT

This chapter describes the insights towards a proposal to integrate a procedural content generation strategy in a computer role-playing usable and accessible learning video game for gaining replayability to encourage engagement and motivation in learners. In order to explain the contextual issues of the topic, the chapter includes a discussion on how computer role-playing video games impact the skills considered crucial for the work in the future—abstraction, system thinking, experimentation, and collaboration—emphasizing the importance of usability and accessibility to ensure effectiveness of the proposal. A first approach of a computer role-playing video game is presented to provide an illustrative example. The prototype will serve for future evaluations with people for usability and accessibility.

INTRODUCTION

Role-playing is an activity that has been present in the development of the human being since the beginning of civilization, and nowadays takes several forms, including video games, that has become the biggest entertainment industry and has proved to be an important tool for education.

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Video games for learning represents a power alternative to develop useful skills and competencies in students (Barr, 2018). Engagement becomes video games an effective learning tool which may be potentiated by blending it with face-to-face approaches, it seems that said strategy do enhance student motivation and can be associated with behavioural change (De Freitas, 2018). In this context, a “*critical component of an engaging game is delivering content to player with incrementally increasing the challenge*” (cited by Adellin, Khuan, & Gertrude, 2019, p. 1); this concept is strongly related to the concept replayability or reply value, which broadly speaking consist in provide gamers the possibility of continue playing a game after its first completion (Adellin, Khuan, & Gertrude, 2019). One important tool to give video games replayability is the use of procedural content generation (PPG), which is currently popular in industry since is suitable to generate several elements of video games with high cost-benefit value, these elements include the construction of levels for platform games, and dungeons (Volkmar, Mählmann, & Malaka, 2019).

Replayability could enhance the experience of players in role-playing video games for education but it is very important to reinforce said strategy with usability and accessibility aspects (Darin, Andrade, & Sánchez, 2018). In this scenario, traditional usability aspects (Nielsen, 1995) should be complemented by including important aspects in such as mobility, multiplayer interactions, enjoyability, fun, satisfaction, storyline, customization, social connectivity, multimodal interaction, among others (Yanez-Gomez, et al., 2019). The goal of usability in this context is to provide user-friendly environments that foster learning in a more attractive, intense, and challenging way to help students in learning a variety of complex skills and abilities (Slootmaker, et al., 2018). Additionally, role-playing videogames should consider the configuration and functionality of the interface within the same game, and control over scenarios (dungeons) and main and secondary characters (Lee & Song, 2019).

Accessibility lies in the same level of importance; in fact, a product cannot be called usable without consider accessibility basics in its design process. As explained in (Bierre et al. 2005) “*While specific needs vary from person to person, the common issue is the same. The need to address accessibility in gaming is real. The number of people interested in gaming transcends age, gender, income, and disability. The disabled are often misunderstood and underestimated in terms of potential and participation*”. Accessibility directly affects players experience and, therefore, to the effectiveness of the video game’s purpose. Designing accessible video games include devices for control and interactions with user interface (Compañ-Rosique, et al., 2019). Related to said requirements (Tyagi, Choudhary, & Majumdar, 2019) found three families of accessibility issues that players currently face: (1) Don’t receive feedbacks; (2) No identification of in game responses; (3) No way to provide the input from the various input devices used. In this way it is necessary to have strategies, approaches, and/or tools that result in video games that can be enjoyed and played by people independently of their skills to operate or perceive things in order to them feel included (Cairns, et al., 2019). (Smith, & Abrams, 2019) particularly explained said general context of video games accessibility from the vantage point of educational perspective, emphasizing that the gamification of learning procedures should foster equity and access to instructional materials for all the students including those with auditory, cognitive, neurological, physical, speech, or visual disabilities.

Literature that integrate the whole context is limited and it has not been found researches that explain in detail the procedural dungeon generation that takes into consideration usability and accessibility aspects during settings of said scenarios. In order to contribute to filling this gap here is proposed first approach for a procedure that provide more control for players allowing the selection of the role that the player must take when using certain character class in a role-playing game having high replayability by adapting its game environment or dungeons considering the character classes. Additionally, multimodal

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