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Carlos Vaz de Carvalho · Paula Escudeiro  
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# Serious Games, Interaction and Simulation

6th International Conference, SGAMES 2016  
Porto, Portugal, June 16–17, 2016  
Revised Selected Papers

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# Preface

SGAMES 2016, the 6<sup>th</sup> EAI International Conference on Serious Games, Interaction and Simulation, was a multidisciplinary event dedicated to research, practice and validation in the fields of serious games, interaction, and simulation.

The serious games area focuses on the design, development, use, and application of games for other purposes than entertainment. The most striking reported effect from the use of serious games is an increased user motivation and engagement toward the “serious” objectives. Interaction and simulation are fundamental tools for this motivation and engagement: providing intuitive and innovative forms of interaction with the game captures the user interest and creating intelligent game play maintains that interest.

However, in spite of the existing evidence of success, there is still limited use of serious games. This has mainly to do with social concerns and stereotypes about the relation of games and serious purposes. But it is also related to the lack of extended evidence of effective application. This is where SGAMES plays a crucial role as a forum to exchange knowledge and best-practices and to disseminate that evidence.

The program of SGAMES 2016 reflected the contributions to core issues of serious game design and development and their application in distinct areas. The keynotes presented state-of-the-art information about two major topics in this field:

- Sylvester Arnab presented the need to harness the potential of hybrid spaces in teaching and learning resulting from the merging of digital and physical experiences and the potential of the playful nature of games and gamification to create contexts for that pervasive learning process.
- Rui Prada analyzed the use of AI characters with socio-emotional agency that increase the range of social situations that players can explore in the application of games to learn social skills.

The definition of models for the collection of usage data (game learning analytics) was a major concern together with the automatic extraction of gameplay design expertise, and the development of a requirements definition model for pervasive games-based learning systems:

- Cano et al. introduce the GLAID (game learning analytics for intellectual disabilities) model that describes how to collect, process, and analyze videogame interaction data in order to provide an overview of the user learning experience, from an individualized assessment to a collective perspective.
- Vahldick et al. propose a model to identify the students’ progress by recording (through game learning analytics) their performance in programming tasks. They demonstrate the model through an implementation in a casual computer programming serious game.

- Raies et al. propose a process to extract and represent the necessary specialized knowledge required to design game-based learning systems in order to transfer that knowledge to novice actors. The process uses ontology techniques based on the semantic annotation of gameplay descriptions.
- In a related approach, Mejbril et al. propose a model, also based on ontology techniques, to define a requirements engineering process in order to improve the development of pervasive game-based learning systems.

Accessibility and social inclusion applications deserved special attention. Articles in these areas addressed aspects like the phonetics awareness of children with Down syndrome, the improvement of the learning of child movements, neurocognitive stimulation and assessment for older people, digital skill building for individuals at risk, older people's interaction with digital gaming on consoles and tablets, sign language learning support and task-specific training for rehabilitation purposes:

- Markham et al. present a study where they examined skill acquisition and retention of a non-injured population performing a sensorimotor navigation task in the computer-assisted rehabilitation environment (CAREN), driving a virtual boat through a scene using weight shifting and body movement. They conclude that task-specific training in immersive VEs may be effective for warfighter operational skills training and the rehabilitation of wounded warriors, by utilizing tasks that lead to long-term retention.
- Jali and Arnab present a study investigating the correlation between the challenges associated with older people, their existing engagement with digital gaming, the andragogical perspectives and existing game design attributes. Their preliminary results demonstrated that older people's initial perspectives and perceptions toward digital gaming and gameplay were influenced by perceived or assumed difficulties, but they were changed once they had broken the confidence barrier associated with engaging with new technologies and experienced the enjoyment from the social aspects of the engagement.
- Costa et al. present a serious game aiming to analyze neurocognitive deficits and stimulate the players' neurocognitive processes. This game is built on top of sound neurocognitive psychotherapy for adults, mainly addressing the cognitive processes of attention and memory. The game simulates real-world scenarios, allowing a better generalization process due to the application of the ecological validity concept.
- Tsalapatas et al. presented the EMPLOY project that addresses the development of digital skills among young learners with the objective of enhancing their future employment opportunities in innovation-related sectors. They conclude that the integration of technology and pedagogies offer broad learning benefits to both students and teachers by enhancing motivation, promoting long-term engagement with the learning process, providing timely and constructive feedback, and promoting critical and entrepreneurial thinking mindsets.
- Simão et al. present a research work that proposes a computer-assisted education application that aims to teach talking and reading through games. The work described was carried out in close cooperation with a child-care institution that works with children with distinct growth disorders, namely, Down syndrome.

- Raposo et al. present a serious game that tackles developmental coordination disorders that can be identified when children show motor skills below the expected levels considered adequate for their physical age and through the creation of a systematic collection of exercises children are able to perform frequently using the user-friendly game.
- Escudeiro et al. present the evaluation methods and techniques applied to a serious game developed within the VirtualSign project, a Portuguese sign language bi-directional translator. The serious game aims to make the process of learning sign language easier and enjoyable.
- From a more technical perspective, Lopes et al. present a research work that introduces a new generic software layer between the gesture capture device and the application level, therefore hindering lower-level, software/hardware details from a developer and letting him or her focus directly on the application level. This work is also planned to be used in the context of sign language support.

Other application areas included intelligence analysis and energy efficiency.

- Bourazeri et al. present the Social Mpower game, a representation of an autonomous energy community for local power generation and distribution in which the participants have to avoid a collective blackout by individually reducing their energy consumption by synchronizing and coordinating their actions.
- Rudnianski et al. present LabRint, a serious game that provides intelligence analysts with a set of learning experiences. The game focuses on three stages of intelligence analysis: information collection and structuring, inference schemes development, and determination of inferences about the issue under scrutiny.
- Cesário et al. present ClueKing a children's pervasive game that encompasses context-aware and parent mediation to create an informal learning environment. The basic concept of ClueKing is an interactive environment where teachers define the learning goals and challenges and parents mediate their application on the home setting, on the children's schedule, and on how to promote their engagement.

Gamification was also approached and its use in software development contexts was presented.

- Silva et al. present the use of gamification to encourage software developers to use agile methodologies and tools with the necessary regularity. The main focus of this work is on the task completion and the regular use of the project management tool, while insuring the respect of the values proposed by the agile manifesto to software development.
- Jurado et al. describe a model for the design of game strategies based on related works in the field of gamification and its applications, composed of three components: a game environment process, a game environment, and a component for measurement and evaluation. This proposition seeks to offer a methodological tool for the design of game strategies in the field of gamification, applied to knowledge management.

SGAMES 2016 was also meant to foster interaction and informal networking between researchers. Taking advantage of the fact that several European R&D project coordinators attended the conference, an expert panel was organized to discuss several topics related to the submission and management of these projects, namely:

- How to successfully prepare a project proposal
- How to lead and manage such a complex project
- How to monitor and assess the project development
- How to disseminate and make widely public project results
- How to sustain project results after the life of the project

Finally, another innovation in SGAMES 2016 was the presentation of exemplary serious games developed in the context of academic studies. The selected serious games for this show were:

- No Bug's Snack Bar: A Casual Serious Game to Support Introductory Computer Programming Learning, by Adilson Vahldick, a game to help learn the initial topics in introductory computer programming courses
- English Is Cool, by Ana Sousa Silva and Sandra Patricia Queirós, an educational game to learn basic concepts of English
- Car Driving Simulator, by Vasco Vaz and Alexandre Bastos, a car driving simulator that helps in learning the basic traffic rules
- Nutrigame, by Francisco Fernandes and Orlando Neves, an adventure game that develops competences in nutrition
- VirtualSign Game, by Marcelo Norberto, a game aiming to aid the learning of Portuguese Sign language
- Cognitive Stimulation Game, by Jorge Neto and João Costa, a game that stimulates the players' cognitive processes
- Escalada Musical, by Augusto Manuel Bilabila, Fábio Amarante and Mariana Derigi Ambrózio, a game of musical perception that fits the music education curricula

SGAMES 2016 was once again an excellent opportunity to be in contact with the most recent research and development in the serious games domain. The quality of the contributions and discussions clearly showed tremendous potential for evolution, which we expect will continue in the next few years. We look forward to seeing you in 2017.

November 2016

Carlos Vaz de Carvalho  
António Coelho  
Paula Escudeiro



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