Serious and Fun Games

Introduction to the Special Thematic Session

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Abstract. Serious and Fun Games Special Thematic Session aims to bring together academic scientists, researchers, Ph.D. students and research scholars to exchange and share their experiences and research results on all aspects of Game-Based Learning and Serious Games helping people with disabilities and people who need special education. The target groups of these Serious Games are blind people or people with low vision, hearing impairment, motion challenges, learning problems or children with special diets for example type 1 diabetes, or food allergy. It also provides an interdisciplinary platform for researchers, practitioners, and educators to present and discuss the most recent innovations and trends. Moreover, to share and concern practical challenges encountered, and solutions adopted in the fields of Game-Based Learning and Serious Games. High-quality research contributions describing original and unpublished results of conceptual, constructive, empirical, experimental, or theoretical work in all areas of Game-Based Learning and Serious Games were cordially invited for presentation at the STS.

Keywords: Serious Game · Universal design · Special thematic session

1 A Few Words About Serious Games

Comenius advised teachers to organize lessons into easily assimilated steps to make learning gradual, cumulative, and pleasant [1, 2]. He emphasized the function of playing as a pedagogically effective activity. Today, we could say that Comenius’ ancient motto, Schola Ludus, has found new meaning in the modern use of interactive educational programs that use play and games as pedagogical tools [3].

Playing games, including intelligent serious games, shows all of the attributes needed for ‘flow’ according to Sellingmann and Csikszentmihaly [4]: playing computer games is a challenging activity which requires skills, it contains action and demands awareness, it has clear goals and provides the player with immediate feedback. During the process of playing, absolute concentration on the task is required. A well-designed game transports its players to their personal flow zones, delivering genuine feelings of pleasure and happiness [5].

The term “serious games” denotes digital games serving serious purposes like education, training, advertising, research and health. Compared to traditional interventions, these games may help elderly people to improve their health by enhancing
physical fitness and coordinative abilities by combining increased motivation, game experience like fun and game flow and training. Serious games, particularly adventure and shooter games, already play an important role in prevention and rehabilitation, e.g. to enhance health-related physical activity, improve sensory-motor coordination [6, 7]. Serious games are electronic games whose main purpose is “serious” and not to simply entertain. The primary “serious” purposes can be to teach or train in areas such as education, semiformal educational settings, health care, advertising, politics, etc. [8]. Digital games, simulations, virtual environments and mixed reality/media that provide opportunities to educate or train through responsive narrative/story, gameplay or encounters [9]. Serious games is built with pedagogical principles and education and training purposes, supported by gaming techniques and entertainment [10]. A classification referring to games that are specifically designed for a particular purpose. These games are often for education, training, and advertising, and are more often used in particular industries like health care and the military [11].

Initially, serious games where considered to be games with a purpose. The basic idea behind serious games is to hide important and time-consuming tasks behind a gaming veil. They are games that have scope beyond recreation [12].

The idea of using games or game technologies for “serious”, e.g., educational purposes is as old as the idea of “learning games”, but is not limited to those forms. As opposed to games designed for entertainment, serious games can be defined as computer games aiming towards an underlying second “off-game” goal that differs from in-game goals such as finishing a level or gaining high scores. Beyond the surface of gaming actions—or embedded into those—, serious games try to evoke learning processes or even complex experiences (e.g., through taking the perspective of political refugees, trying to bring them out of a danger zone). Computer game art can be seen as a related form of serious games, aiming, for example, towards open aesthetical experiences rather than following didactic concepts and defined learning goals [13].

Do not think that only young people play. In 2018, people aged 65+ outnumbered children under five years old globally for the first time in history [14]. By 2050, over 16% of the world’s population will be 65 years or older [15]. According to Nielsen and even as far back as 2012, reports showed us that over 70% of US disposable income is controlled by individuals aged 65 and above [16]. This consumer age-group is not a stranger to games. “Peak NES (Nintendo Entertainment System) sales” happened when they were in their 30 s and 40 s, with many of their children engrossed in the first generation of Mario and Zleda games. Furthermore, this age group is currently one of the most engaged mobile game player segments in the world. The largest group of mobile gamers is 55+ (albeit this is also the largest age bracket within the data). As such, taking any learnings to heart on how to serve this growing group of diehard mobile gamers with a high income [17]. The work of Carvelho et al. [18] has confirmed positive results on a population with visual disabilities, while Baker [19] has arrived to similar positive and encouraging results working with people with autism, and also Schneider et al. [20], who worked with persons with dyslexia. Brown et al. [21] proved in their project the effectiveness of combining serious games with mobile apps, which can be used anywhere, to reach a higher level of independence of persons with Down’s syndrome.
Intelligent serious games are raising many hopes for developments in the educational field and in the rehabilitation in the upcoming decades. Numerous studies have demonstrated the effectiveness and usefulness of serious games not only in education [22–24] but also in rehabilitation in e.g. stroke patients [7].

2 The Session of Serious and Fun Games

This year we have 4 papers, from various European countries. The STS presentation “Serious and Fun Games” tries to achieve progress here to the Future Perspectives in AT, eAccessibility and eInclusion. The target groups could be very wide: pre-school children, young and elderly people. Everybody likes to play. Moreover, if the game is not only for entertainment but it helps people with special needs. If their designs based on the universal design, these games are excellent.

One of this year’s papers deals with a newly developed serious game for preschool-age children who have been newly diagnosed with type 1 diabetes. The software consists of two parts, an editor and a game part. The editor part is for the parents, so they can adjust the game according to their child’s daily allowable carbohydrate meals. Parents can upload pictures and data of meal/food into the game database. The game main menu contains four games for the children: “True/False quiz”, “Which food has more/fewer carbs”, “Take it to your plate” and the reward game: “Feed the figure” game. This paper shows the design, development and evaluation process of the game. The evaluation process has been based on the System Usability Scale. It is an innovative game because it is useful for children who have multiple diseases e.g. diabetes and gluten or lactose sensitivity.

The accessibility development on the mobile game is more difficult than in regular computer applications. Most computer games are not developed to be played by people with special needs [25], because they cannot access input sensors and graphical user interface in a sufficient way. Mobile card games are a quite popular and large group of games available in the Google Play store. Dobosz and Adamczyk have selected 15 most popular of them for their analysis. The accessibility features in their study were e.g. custom control, configurable colours, voice messages, audio messages, vibrations, etc. It was found that most games do not meet even half of the verified attributes of availability. Furthermore, the same set of games was analyzed in terms of actions performed: get a card, discard a card, returning a card to the opponent, etc. After analysis, it was found that most card games have only a few actions. The authors have also investigated the Question-Answer mode. However, some games that are placed in the card game genre involve a board or cards that are arranged on the table in a special way (as solitaires). In consequence, a list of question in the Question-Answer will be uselessly long. In their investigation, a group of 11 voluntaries participated in the study. They play the game several times (30 min).

Game interactions require physical manipulation of game controls by hands and body motions (such as keyboard, mouse, gamepad and joystick), which may exclude people with motor disabilities. Although gaze control transforms game controls and liberates the hands, challenges remain on how to design gaze control for different game mechanics and various motor disabled people. The problem is that people with motor
disability may have difficulties playing games with conventional game controls requiring physical manipulation, such as keyboard, mouse, gamepad and joystick. The research question is: What is the acceptance of gaze control among novice players and people with upper-limb motor disability for game accessibility? What would need to be improved upon regarding usability and game experience to enhance acceptance? Answering these questions, the authors of the next paper presented a game accessibility study of gaze control modality for novice players and disabled people and addressed two research questions. First, gaze control modality demonstrated possible game accessibility to people with motor disabilities. The acceptance of gaze control among novice players and upper-limb motor disabled people for game accessibility is high. Second, it indicates that the challenge of game mechanics and the accuracy of the gaze-control system are two significant impact factors. The game mechanics need to be designed thoughtfully for the conditions of people with disabilities, including gaze-control-friendly user interfaces, appropriate challenge, simple game scenes, and appropriate game duration for each round to avoid being overwhelmed by visual feedback and eye fatigue. Furthermore, the accuracy of gaze control system should be improved to enhance the acceptance of gaze-control modality.

Nishchyk et al. present a prototype of an augmented reality exergame for elderly people to perform physical exercise at home. A user-centered design approach was adopted to guide the design and development process. The research aimed to create a safe exercising environment with a game narrative to motivate elderly users to exercise. The first prototype has been developed with a few basic exercises as a proof of concept but has a possibility of extension during the next development iterations. The results of the first prototype testing have shown that the game has potential to achieve the goal of the research. The participants have shown a positive attitude towards the prototype. They also have provided a useful feedback, which would help with further development.

3 Conclusion

The presentations in this Special Thematic Session are the first steps in the ICCHP conference series to introduce the newest serious games for special needs users. Hopefully, there will be similar sessions in future conferences. Moreover, we also hope that the youngest scientist generations will be motivated by this Special Thematic Sessions.

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