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Volume Editors

Stefan Göbel
Technische Universität Darmstadt
Multimedia Communications Lab – KOM
Rundeturmstr. 10, 64283 Darmstadt, Germany
E-mail: stefan.goebel@kom.tu-darmstadt.de

Wolfgang Müller
University of Education, Weingarten
Media Education and Visualization Group
Leibnitzstr. 3, 88250 Weingarten, Germany
E-mail: mueller@md-phw.de

Bodo Urban
Fraunhofer Institut für Graphische Datenverarbeitung IGD
Joachim-Jungius-Str. 11, 18059 Rostock, Germany
E-mail: bodo.urban@igd-r.fraunhofer.de

Josef Wiemeyer
Technische Universität Darmstadt
Human Sciences, Sport Science
Magdalenenstr. 27, 64289 Darmstadt, Germany
E-mail: wiemeyer@sport.tu-darmstadt.de

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Preface

The GameDays were established in 2005 as a “science meets business” workshop in the field of serious games, taking place on an annual basis in Darmstadt, Germany. The principle aim is to bring together academia and industry and to discuss the current trends, grand challenges, and potentials of serious games for different application domains. Since 2010, the academic part has been emphasized resulting in the first International Conference on Serious Games for Sports and Health. In 2011, the GameDays spectrum of topics was broadened and the different facets, methods, concepts, and effects of game-based learning and training have been covered since then.

Similarly, the Edutainment conference provides an international forum for researchers and practitioners in various disciplines to share and exchange experiences in the emerging research area combining education and entertainment. Edutainment 2012 kept its tradition as a major international conference, facilitating the international exchange of the state of the art in academic research and practice. The conference covered all aspects of pedagogical principles, designs, and technological issues for education and entertainment.

The organizers of the GameDays series highly appreciated the request by the Edutainment initiators to bring Edutainment 2012 to Europe and to combine it with GameDays 2012. A joint Editorial Board and Program Committee were set up to cover both areas. All scientific papers were reviewed by 4 reviewers on average; the overall acceptance rate was 50%. Authors originated from 18 countries all over the world, among others Australia, China, Hong Kong, Japan, Singapore, Taiwan, and the United States, as well as Germany and different European countries.

The topics of the papers cover the fields of (game-based) training, teaching and learning, emerging learning and gaming technologies, authoring tools and mechanisms, and serious games for health. Further, two workshops were offered in the context of authoring tools for the creation of serious games and edutainment applications (StoryTec) and the selection of appropriate virtual environments for teaching and learning purposes (Vicero). Practical demonstrations of systems (e.g., tools or interactive installations) and applications (games, learning environments) – ranging from ideas and concepts (posters) to prototypes and commercially available products – were provided within the exhibition space throughout the three conference days. There were more than 30 exhibits altogether.

The editors would like to thank all PC members for their tremendous work and all institutions, associations, and companies for supporting and sponsoring the Edutainment and GameDays 2012 conference: Technische Universität Darmstadt (Multimedia Communications Lab – KOM, Institute for Sport Science, Graduate School Topology of Technology and Forum for Interdisciplinary

Research – FiF), Fraunhofer Institute for Computer Graphics, Hessen-IT, German Association of Computer Science, German Chapter of the ACM, G.A.M.E. (German game developers association), BIU (German association for the interactive entertainment industry), VDE/ITG Association for Electrical, Electronic and Information Technologies, Darmstadt Marketing, KTX Software Development, and Springer.

Special thanks goes to Springer for publishing the proceedings of the Entertainment conference series in LNCS since its beginning in 2006, to Hessen-IT for supporting the GameDays since its early days in 2005, and to the Forum for Interdisciplinary Research (FiF) for bundling and supporting the wide range of serious games research activities at the Technische Universität Darmstadt (TU Darmstadt). The forum offers space for topics, problems, and projects too broad to fit within the framework of a single discipline. It proved to be the perfect partner for expanding the various serious games research efforts and consolidating the network of serious games researchers at the TU Darmstadt. The disciplines involved in the FiF Serious Games Research Group range from computer science, bioinformatics, and civil engineering to mathematics, sports science, and psychology. Further information about the interdisciplinary research in serious games at TU Darmstadt is available at www.fif.tu-darmstadt.de.

Further information about the joint conference on E-Learning and Games for Training, Education, Health, and Sports is available on the conference website: <http://www.edutainment2012.de>, <http://www.gamedays2012.de>

July 2012

Stefan Göbel
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Game Science – State of the Art in Game Research and Teaching Games at University

Noah Wardrip-Fruin

University of California, Santa Cruz, CA 95064, United States
`nwf@soe.ucsc.edu`

Abstract. Computer games have made amazing strides in the past 50 years — thanks to work in universities, national labs, and industry. We now see powerful games being made for entertainment, education, fitness, and other purposes. But we also see fundamental limitations in the technology and design approaches used to make today’s games. These limitations have caused AAA team sizes to balloon, have walled designers off from much of the computational power of game technologies, and have made it impossible to integrate the things that matter most in other media into gameplay (including language, social state, storytelling, and more). This limits how much games can matter — and what they can teach us. At the University of California, Santa Cruz we are addressing these challenges directly, bringing computer science research into collaboration with game design and insights from the humanities and arts. We call our approach “Computational Media.” This talk outlines our motivations, our approach, and a selection of our current projects.

Engage! Inspire! Through Digital Experiences

Wolfgang Müller-Wittig

Fraunhofer IDM@NTU,
Nanyang Technological University, Singapore
wolfgang.mueller-wittig@fraunhofer.sg

Abstract. Advances in computer graphics make the creation of realistic interactive virtual and augmented learning environments possible, enabling us to enjoy a whole ambience of new experiences. The effectiveness of education through such virtual means is well captured in this Chinese proverb: I hear - I forget, I see - I remember, I experience - I understand. With highly interactive visual real-time systems, users are submerged in simulated real worlds, where they can visualize complex data and processes in a realistic sensory environment. Apart from science centers, theme parks or museums where topics can be successfully transferred through attractive exhibits using highly interactive virtual and augmented worlds, these technologies are currently entering more and more the classroom offering new digital experiences which are complementary to existing educational approaches. Augmented reality in a classroom of young learners turns the usual learning space of tables, chairs and walls into a rich educational experience. Such interfaces can be either single-user or for multi-users. The single-user is able to interact with the environment, garner information, etc. In collaborative environments, we see the addition of social skills, group dynamics and teamwork towards a shared purpose. With edutainment scaling new heights, the common person is always looking for more interaction, more information in the real world context, at his fingertips and at an instant, and Augmented Reality is able to do this. And all without a keyboard!

Playware – Effects of Playful Training with Modular Playware

Henrik Hautop Lund

Center for Playware, Technical University of Denmark
Building 325, 2800 Kgs. Lyngby, Denmark
`hhl@elektro.dtu.dk`

Abstract. Playware is intelligent hardware and software that creates play. On particular example of such playware is modular interactive tiles that can provide playful training. The playful aspect of the modular interactive tiles motivates e.g. elderly to exercise, and thereby provides an opportunity for maintenance and rehabilitation of functional abilities amongst elderly people. Hence, the modular tiles are used both for prevention and for rehabilitation. The simple set up and adjustment to individual intervention and individual capabilities facilitates the use of the modular tiles both in institutions and in private homes. Hence, the technology can potentially be used to make a continuous flow for patients, in which training with modular tiles can take place in hospital, in training, rehab, and care institutions, and as home training in the private home, where the intervention and the effect is documented. Tests with the modular interactive tiles amongst elderly show that training with the modular tiles has a large effect on the functional abilities of the elderly. The tests of effect show that training with the modular tiles provides improvements on a broad range of abilities including mobility, agility, balancing, strength and endurance. The training improves the abilities of the elderly in many areas of high importance for activities of daily living, in contrast to several other forms of training and exercise, which typically only improve a subpart of these abilities. With the studies of effect amongst elderly, it is shown that playful training with the modular interactive tiles can give such significant effects with substantial less training sessions than what is needed with more traditional training. Indeed, significant improvement are obtained on all test parameters after just 9 training sessions, whereas research show that other training methods typically use at least 25 training sessions. In relation to groups in risk of loss of functional mobility, the tests show that 56At the same time, another test of effect shows that elderly training on the modular tiles improve their dynamic balance ability, whereas elderly in a control group who continue their normal daily activity with no training on modular tiles, decrease their dynamic balance ability. Even though the elderly start at the same level, with a statistical significant increase in balancing ability those elderly training on the tiles are transferred outside the risk group for falls, whereas those not training on the tiles remain at risk of falling.

The Body in Digital Games

Florian ‘Floyd’ Mueller

RMIT University, Bldg. 9.1.27, 124 LaTrobe St,
Melbourne, VIC 3000, Australia
floyd@floydmueller.com

Abstract. Playing with computers mostly means focusing on the mind, rather than the body. However, sports teaches us how powerful experiences can be if the body is involved. In consequence, I propose to see the body as a design opportunity to enhance the digital play experience. I argue that this can be achieved by framing the body’s limitations as challenges that can facilitate bodily play, as inspired by sports. As such, I propose to put the human body into the center of the digital play experience. I illustrate this thinking by presenting recent work from the Exertion Games Lab, including a flying robot as jogging companion, games for commuters on public transport, interactive bicycle helmets, exercise gym equipment that incorporates computer gaming, and interactive basketball hoops.

Acquisition of Nutritional Knowledge Using Footgaming in the Classroom Setting

Robin Mellecker, Lisa Witherspoon, and Tom Watterson

Institute of Human Performance, The University of Hong Kong
robmel@hku.hk

Abstract. The increasing trend in childhood obesity coupled with decreasing levels of academic achievement have given rise to the introduction of innovative technology, which offers physical activity elements together with healthy lifestyle learning objectives. In this preliminary study, we aimed to determine whether participation in Footgaming in the classroom setting would result in learning healthy, nutritional concepts. The experiences of student participation in the academic classroom and teachers perceptions of using active gaming in the academic classroom were also reported in self report journals. A total of 57 students (grades 3rd-5th) played nutritional games on the computer utilizing their feet to control mouse functions on a Footgaming pad. Nutritional knowledge was assessed at baseline and following 10 weeks of Footgaming in the classroom. These preliminary findings suggest that children can learn nutritional concepts using active video games in the classroom setting. Further qualitative analysis revealed that both teachers and students valued the educational experience received from playing the nutritional games. Although preliminary, these findings are an important step in improving the understanding of the influence of physical activity based technologies in the classroom setting.

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