Personalization in Serious and Persuasive Games and Gamified Interactions

Marc Busch
Elke Mattheiss
AIT Austrian Institute of
Technology
Vienna, Austria
{FirstName.LastName}@
ait.ac.at

Rita Orji
McGill University
Montreal, Canada
purity.rita@gmail.com

Andrzej Marczewski
Capgemini UK
Surrey, UK
andrzej.marczewski@
capgemini.com

Wolfgang Hochleitner
Michael Lankes
Playful Interactive Environments
University of Applied Sciences Upper
Austria
Hagenberg, Austria
{FirstName.LastName}@
fh-hagenberg.at

Lennart E. Nacke
University of Waterloo
Waterloo, ON, Canada
lennart.nacke@acm.org

Manfred Tscheligi
University of Salzburg &
AIT Austrian Institute of Technology
manfred.tscheligi@sbg.ac.at

Abstract

Serious and persuasive games and gamified
interactions have become popular in the last years,
especially in the realm of behavior change support
systems. They have been used as tools to support and
influence human behavior in a variety of fields, such as
health, sustainability, education, and security. It has
been shown that personalized serious and persuasive
games and gamified interactions can increase
effectivity of supporting behavior change compared to
"one-size-fits all"-systems. However, how serious
games and gamified interactions can be personalized,
which factors can be used to personalize (e.g.
personality, gender, persuadability, player types,
gamification user types, states, contextual/situational
variables), what effect personalization has (e.g. on
player/user experience) and whether there is any
return on investment is still largely unexplored. This
full-day workshop aims at bringing together the
academic and industrial community as well as the
gaming and gamification community to jointly explore
these topics and define a future roadmap.

Author Keywords

Personalization; Serious Games; Persuasive Games;
Gamified Interactions.

ACM Classification Keywords
H.1.2 User/Machine Systems: Human factor

Introduction
Serious games, which are games used for purposes other than entertainment [18], have been shown to be a useful tool for enabling game-based learning in a variety of domains, such as education and business [3]. *Persuasive games* [2] can be seen as a sub-category of serious games. They do not only focus on imparting knowledge and raising awareness about a topic or an issue, but also on attitude or behavior change in a desirable direction, e.g. towards a more healthy lifestyle [15]. In a broader view, other game-like applications (which can be used for promoting learning, attitude, and behavior) such as gamified interactive systems can also have a persuasive goal. Gamified systems which use game elements in non-game environments [5] have attracted attention of researchers and practitioners over the past few years [7]. Gamification and the field of *Persuasive Technology* [6] or *Behavior Change Support Systems* [14] share many common mechanisms, such as the use of virtual rewards [20] and other engagement strategies, such as challenges [13]. In this manner, gamification mechanisms can be used for persuasive systems.

Serious Games, persuasive games as well as gamified interactions are effective when they successfully educate users about certain topics, support them in attitude or behavior change, raise awareness or engage them in specific topics. These kinds of interactive systems are more effective when they are *personalized* in contrast to employing the *"one-size-fits-all"*-approach. The effectiveness of personalized systems over "one-size-fits-all" approaches also applies to interactive systems in general. For example, the efficacy of personalization has been shown in personality-targeted user interface design [12], persuasive technology [8,9] and games [1,3,15]. Personalization has been investigated along several dimensions, such as *personality* [12], *cognitive abilities* [4], *gender* [16], *persuadability* (the susceptibility to persuasive strategies, [10]) as well as *player types* [15] and *gamification user types* [11]. Whereas these variables — in a broader sense — refer to (dispositional) human traits (variables that are hypothesized to be more or less stable), it is also possible to personalize along human emotional states, such as *mood*. Furthermore, besides those *personal* variables, *contextual* and *situational* variables (e.g. the *environment* and *social influences*) can also be used as personalization dimensions.

Being more effective can refer to a higher experience of *flow* or *presence* [19], more fun when playing games or using gamified technology, or the experience of a higher *emotional* or *cognitive appeal*. This can improve *player/user experience* and *satisfaction* [17] which can in turn increase *usage frequency* of serious games and gamified systems. An increased usage frequency is not only desirable as an end itself, but can also indirectly support the purpose of the technology. In case of persuasive games, for example, an increased usage frequency can increase the persuasive effect of that technology.

From an industrial point of view, an increased adoption of a game or gamified system can lead to *higher revenue*. This is especially the case with certain new business models in game industry: For free2play, free2use, freemium mobile games and apps, a higher

usage frequency might be associated with more in-app or game purchases.

Aim and Topics of the Workshop

Although personalization of serious and persuasive games and gamified interactions is a highly promising field and has become a hot topic (especially in the past few years), many aspects of it are underexplored. These aspects refer to theoretical considerations such as relevant dimensions for personalization, the effect of personalization, models for personalization, design practices, the differences and communalities between personalization, customization, adaption and tailoring, guidelines, case studies of personalized serious games and gamified systems and market-relevant considerations.

To advance the state of the art in this field and to build a community of academic and industrial stakeholders in the fields of serious games as well as gamification, we invite for participation in this full-day workshop by submitting position and research papers that cover the following topics:

- Theoretical explorations of the differences and communalities of the notions personalization, customization, adaptation and tailoring.
- Contributions exploring factors for personalization, e.g. personality, cognitive abilities, gender, persuadability, player types, gamification user types, different states, customization of game input/output devices, preferences in regard to the game interface, game preferences as well as contextual and situational variables.
- Studies showing the effect of personalization, especially on several relevant dependent variables, e.g. holistic player/user experience, emotional and cognitive appeal, usage frequency and cultural background.
- The development and validation of new and improved models for personalization e.g. advanced player/gamification user type models.
- Contributions exploring design practices, guidelines and challenges as well as procedures and patterns, around personalization of serious games and gamified systems.
- (Industrial) case studies and (commercial) examples of personalized serious and persuasive games and gamified systems (benefits, risks, practical impact).
- Success stories and stories of failure with regard to personalization of serious and persuasive games and gamified systems. Limitations and requirements of personalization.
- Studies on the return of investment and costs-benefits analyses of personalization in serious and persuasive games and gamified interactions.
- Other market- and industry relevant considerations of personalized serious games and gamified systems as well as new business models and opportunities for personalization (e.g. personalization as premium feature).

Audience and Workshop Submissions

We invite an academic and industrial audience from a diverse range of backgrounds and roles, such as research, product development, engineering, design and marketing. Workshop submissions are invited in the following categories:
- position papers (2–4 pages)
- work-in-progress papers (2–4 pages)
- full research papers (4–6 pages)

- videos and interactive demos (along with 2–4 pages description)

Page limits exclude bibliography. The submissions have to be formatted according to the ACM SIGCHI Extended Abstract format[1].

Before the Workshop

The workshop will be advertised through following means: A workshop website with all relevant information will be established. A call for participation will be distributed over well-known mailing lists, such as CHI/NordiCHI/UbiComp-Announcements, BCS-HCI, Gamification, Persuasive Technology network and social media channels, such as Twitter, LinkedIn and Facebook. On Twitter, we will ask relevant stakeholders to distribute the call for participants (e.g., @GamesUR, acagamic, daverage, andersdrachen). On Facebook and Twitter, we will ask organizations (e.g. Interaction-Design Foundation) and projects (e.g. GEMPLAY, Bike'n'Play) to post the call for participation on their sites. Furthermore, we will contact initiatives and interest groups such as gamified.uk or gamasutra.org to create a post on their website.

We will establish a workshop program committee and all submissions will be reviewed by at least two peers.

During the Workshop

The workshop will be organized as a mini-track with several sessions around the workshop topics (see above) and an interactive hands-on design experience. In this design session, participants will jointly create low-fidelity prototypes and concepts for personalized

---
[1] https://github.com/sigchi/Document-Formats

serious and persuasive games and gamified systems. We expect a minimum of 8 and a maximum of 14 submissions and about 10 to 18 participants.

The schedule is roughly planned as following:

- 9.00–9.30 Welcome, Introduction and Keynote
Participants and workshop organizers will shortly introduce themselves. Workshop organizers present the agenda for the day. A short keynote will kick-off the workshop.

- 9.30–11.00 Paper Session & Panel I
This session will cover very short presentations (max. 8 minutes per contribution) of the submissions, which are clustered thematically. Afterwards, the presentations will be discussed in a panel, with the authors of the papers being the panelists.

- 11.00–11.15 *Coffee Break*

- 11.15–12.45 Tutorial Session
In an interactive tutorial session, the workshop organizers will present tools and strategies to personalize serious games and gamified interactions (e.g. player type models and questionnaires).

- 12.45-13.45 *Lunch*

- 13.45-15.15 Paper Session & Panel II

- 15.15–15.30 *Coffee Break*

- 15.30–17.30 Hands-on design experience
To apply and to reflect the input from the morning and afternoon sessions, participants will form teams of 2–3

people and design low-fidelity prototypes (e.g. storyboards, click-dummies) with personalized game and gamification mechanics based on pre-defined user profiles/characteristics (which will be prepared by the organizers).

- 17.30–18.00 Discussion of design experience, future roadmap, wrap-up

The workshop will close with a short discussion of the design experience and a planning of future events (e.g. journal special issue, follow-up workshop).

- 20.00 Joint workshop dinner

After the Workshop

Accepted submissions will be made available in proceedings published on the workshop website and promoted through several means (e.g. social media; see above). We plan to propose a special issue to a game-related journal, such as *The International Journal of Computer Game Research* or *International Journal of Gaming and Computer-Mediated Simulations*, to which we also invite extended versions of the workshop contributions.

About the organizers

Marc Busch and *Elke Mattheiss* are working at the business unit *Technology Experience* within the Austrian Institute of Technology GmbH, which is Austria's largest independent research organization. They have a broad experience in research and development of serious games and in personalization of interactive systems. Currently they are involved in the projects GEMPLAY – GEndered games Motivating

Physical ActivitY[2] and Bike'N'Play. *Rita Orji* is a Postdoctoral Fellow at McGill University, Canada and Visiting Senior Lecturer at Nnamdi Azikiwe University, Nigeria with research expertise in personalization for serious and persuasive games. *Andrzej Marczewski* is a gamification consultant, designer, speaker, author, thought leader and creator of the Gamified.uk blog. He is currently working at Capgemini UK as a solution designer and gamification expert. *Wolfgang Hochleitner* and *Michael Lankes* work at the Playful Interactive Environments (PIE) lab that is part of the University of Applied Sciences Upper Austria. Their area of expertise ranges from game design, ludic interaction techniques to game development. *Lennart E. Nacke* is an Associate Professor focused on digital experiences at the University of Waterloo. He chaired CHI PLAY 2014 and Gamification 2013. *Manfred Tscheligi* is Professor of Human-Computer Interaction at the University of Salzburg and Head of the Business Unit Technology Experience at AIT. He has been working in the area of Interactive Systems, Human Computer Interaction, Usability Engineering, User Interface Design and User Experience Research for more than 20 years. He is pioneer in establishing this field in Austria, author of several publications and distinguished speaker at conferences.

Acknowledgements

---

[2] http://gemplay.at/de/project-description/

References

1. Bakkes, S., Tan, C.T., and Pisan, Y. Personalised gaming. *Proceedings of The 8th Australasian Conference on Interactive Entertainment: Playing the System*, (2012).
2. Bogost, I. *Persuasive games: The expressive power of videogames.* 2007.
3. Connolly, T.M., Boyle, E.A., MacArthur, E., Hainey, T., and Boyle, J.M. A systematic literature review of empirical evidence on computer games and serious games. *Computers & Education 59*, 2 (2012), 661–686.
4. Crabb, M. Human cognitive measurement as a metric within usability studies. *CHI Extended Abstracts*, (2013).
5. Deterding, S., Khaled, R., Nacke, L., and Dixon, D. Gamification: Toward a definition. *CHI*, (2011).
6. Fogg, B.J. *Persuasive technology - using computers to change what we think and do.* Morgan Kaufmann, 2002.
7. Hamari, J., Koivisto, J., and Sarsa, H. Does gamification work? -- A literature review of empirical studies on gamification. *47th Hawaii International Conference on System Sciences*, IEEE (2014).
8. Kaptein, M., Markopoulos, P., de Ruyter, B., and Aarts, E. Personalizing persuasive technologies: Explicit and implicit personalization using persuasion profiles. *International Journal of Human-Computer Studies 77*, (2015), 38–51.
9. Kaptein, M., De Ruyter, B., Markopoulos, P., and Aarts, E. Adaptive persuasive systems: A study of tailored persuasive text messages to reduce snacking. *ACM Transactions on Interactive Intelligent Systems (TiiS),* 2(2), 10.
10. Kaptein, M.C. Personalized persuasion in ambient intelligence. *Journal of Ambient Intelligence and Smart Environments,* 4(3), 279-280.
11. Marczewski, A. Gamification user types 2.0. 2014. http://www.gamasutra.com/blogs/AndrzejMarczewski/20131129/205957/Marczewskis_Gamification_User_Types_2 0.php.
12. Nov, O., and Arazy, O. Personality-targeted design: Theory, experimental procedure, and preliminary results. *CHI*, (2013).
13. Oinas-Kukkonen, H., and Harjumaa, M. A systematic framework for designing and evaluating persuasive systems. *Persuasive Technology*, (2008).
14. Oinas-Kukkonen, H. Behavior change support systems: A research model and agenda. *Persuasive Technology*, (2010).
15. Orji, R., Mandryk, R.L., Vassileva, J., and Gerling, K.M. Tailoring persuasive health games to gamer type. *CHI*, (2013), 2467–2476.
16. Orji, R., Mandryk, R.L., and Vassileva, J. Gender and persuasive technology: Examining the persuasiveness of persuasive strategies by gender groups. *Persuasive Technology,* (2014).
17. Orji, R.O. Design for behaviour change: A model-driven approach for tailoring persuasive technologies. *PHD Thesis*, University of Saskatechwan (2014).
18. Susi, T., Johannesson, M., and Backlund, P. Serious games – an overview. *ELearning 73*, 10 (2007), 28.
19. Weibel, D., Wissmath, B., and Groner, R. Presence vs. flow in the context of computer games. *PRESENCE 2007*, (2007).
20. Zuckerman, O., and Gal-Oz, A. Deconstructing gamification: Evaluating the effectiveness of continuous measurement, virtual rewards, and social comparison for promoting physical activity. *Personal and Ubiquitous Computing*, (2014), 1–15.