Ninth International Workshop on Behavior Change Support Systems (BCSS 2021)

Piiastiina Tikka, Nataliya Shevchuk and Harri Oinas-Kukkonen

Oulu Advanced Research on Service and Information Systems Group, Faculty of Information Technology and Electrical Engineering, University of Oulu, Finland
piiastiina.tikka@oulu.fi, nataliya.shevchuk@oulu.fi, harri.oinas-kukkonen@oulu.fi

1 Introduction

Systems that are designed to help us to help ourselves – that would be one way of describing Behavior Change Support Systems (BCSSs). Today's technology offers versatile tools and components with which to build such support systems combining sensors and increasing processing power with inventive smartphone app designs, smart watches or wearables in useful, compelling devices [1,2,3]. To construct such systems, a multi-disciplinary approach is more the rule and an exception [4], as system design and implementation requires not only understanding of putting a software system together but also understanding of human behavior and needs, problem domains and their requirements, and understanding of various contexts of use. When the right mix of knowledge, insight and ability converge, behavior change supporting information systems can be created.

To embrace the multidisciplinary approach, the BCSS Workshop has for many years brought together researchers of different degrees of experience to present and discuss their research. The international workshop series on Behavior Change Support Systems acts as an umbrella for work that discusses not only new concepts for possible behavior change systems, but also how to construct them, how to understand their users better, and how to learn more about the processes involved in constructing these systems. The Ninth International Workshop on Behavior Change Support Systems presents new and interesting research in the field, and brings together experts from a wide range of disciplines, such as information sciences, human-computer interaction, industrial design, psychology and medicine.

2 The Ninth International Workshop on BCSS

This year, the online workshop was organized in conjunction with the 16th International Conference on Persuasive Technology 2021 (Bournemouth, UK) by Professor Harri Oinas-Kukkonen and Dr Piiastiina Tikka (University of Oulu, Finland) as Programme chairs, and Dr. Nataliya Shevchuk as the Organising Chair.

We wish to thank the Programme Committee members for their support and work:

- Alpay, Laurence (InHolland University of Applied Sciences, The Netherlands)

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- Burri Gram-Hansen, Sandra (Aalborg University, Denmark)
- Enwald, Heidi (University of Oulu, Finland)
- Iyengar, Sriram (University of Arizona, USA)
- Haque, Sanaul (Institute of Technology, Carlow, Ireland)
- Keikhosrokiani, Pantea (Universiti Sains Malaysia, Malaysia)
- Langrial, Sitwat (Namal Institute, Pakistan)
- De Vries, Roelof (Twente University, The Netherlands)
- Yasuoka, Mika (Roskilde University, Denmark)
- Zhao, Li (Capital University of Business and Economics, China)

3 Presented work

This Ninth International Workshop was carried out online with an impressive attendance by experts from all around the world. The workshop included eight peer reviewed papers, both full papers and work-in-progress (short) papers. The papers addressed topics from health to e-commerce. The range of papers not only showcases the celebrated core of BCSS creation that is the multidisciplinary approach, but also the variety of domains that can benefit from BCSSs.

In their paper "mHealth Applications for Childhood Cancer Support and Self-management: Persuasive Systems Design features" Vlahu-Gjorgievska, Hart, Basahal, Pokharel and Win present a Persuasive Systems Design (PSD) analysis of mHealth applications for child cancer support. Through the review and analysis, the authors were able to see how any persuasive features in such applications offered support for young cancer patients in terms of helping with motivation for behavior change.

A paper that also approached a self-management topic described the development process for mobile apps to support home rehabilitation for elderly people with a recent hip replacement. "Applying Persuasive Design to Support the Elderly in Home Rehabilitation: Report on explorative studies" by Alpay, Koster, Dallinga and Wauben describes the development of two mobile app prototypes by employing the CeHRes roadmap as the basic framework and applying the PSD model [5] and Fogg Behavioral Model [6].

The third paper at the workshop compared persuasive system feature presence with user reviews for those systems employing the features. In their paper "Exploring the Impact of Persuasive System Features on User Sentiments in Health and Fitness Apps" Nutrokpor, Ekpezu, Wiafe and Wiafe looked into sentiments expressed in various health and fitness app user reviews in the app marketplace and how these sentiments coincided with the identified persuasive features in those apps, using cluster analysis.

Another aspect into public response to persuasive messages came from Langrial and Araimi in their paper "Social Behavior Change Messages for Tackling COVID-19" where the authors explored, using focus group discussions, the effect of multimodal persuasive appeals to the public.

Health related contributions continued with Kekkonen and Oinas-Kukkonen and their paper "Doctoral Student's Battle of Stress – Designing BCSS to Help Them Win the Battle: Searching for Design Improvements via Workshops with End-Users." The

paper describes the process of workshops with doctoral students to guide the development of a system prototype that eventually employed a number of PSD features and built upon the principles from Self-Determination Theory (SDT).

With interest in how people set goals and comparing that to goals set by others, Khan and Maes set up an experiment, reported in their paper "Self-determined Behavior Change Goals are Dynamic, Diverse and Intrinsically-Motivated." In a four-week study their participants were allowed to set their own little behavioral goals, or select a goal suggested by the researchers, and the researchers observed the participants' goal-setting behaviors along the way.

Gaming was also present in the workshop through the work by Ganesh, Ndulue, and Orji and their paper "The Design and Development of Mobile Game to Promote Secure Smartphone Behavior." In this study the authors employed game design as the means to educate end-users as regards privacy-sensitive and security-conscious behaviors. The design employed a number of persuasive strategies and game design patterns with the purpose of maintaining engagement, motivation and interest.

The final presentation of the workshop was "Project-Machete: A Weapon to Cut Through the Amazon(.ca)" by Lewis. The paper presented a system (a browser extension) that simplified the online store's persuasive and influence features to more bare-bones presentation of relevant information. The purpose of such simplification was to curb impulsive and extrinsically influenced shopping. Effectively, the paper looks into the possibilities of removing persuasive features from an e-commerce site.

As we can tell from the broad variety of topics and problem domains addressed in the presentations, approaching persuasive systems from a scientific perspective allows us to learn and understand better the various mechanisms and the range of variables involved in designing for such a challenging purpose as behavior change. We thank all the presenters and workshop participants for their contributions.

References

1. Arnold B. NPD Group. (2014) Wearable tech device awareness surpasses 50 per- cent among US consumers, according to NDP URL: https://www.npd.com/wps/portal/npd/us/news/press-releases/wearable-tech-de- vice-awareness-surpasses-50-percent-among-us-consumers-according-to-npd/ [ac- cessed 2018-11-1]
2. Kulyk, O., op den Akker, H.J.A., Klaassen, R., van Gemert-Pijnen, J.E.W.C. (2015) Personalized Virtual Coaching for Lifestyle Support: Principles for Design and Evaluation. International journal on advances in life sciences. 6(3-4), 300-309
3. Reeder, B. and David, A. (2016). Health at hand: A systematic review of smart watch uses for health and wellness. Journal of Biomedical Informatics. Vol. 63, pp.269- 276.
4. Oinas-Kukkonen H. (2013) A foundation for the study of behavior change support systems. *Personal and ubiquitous computing*, Vol. 17, No. 6, August 2013, pp. 1223-1235.
5. Oinas-Kukkonen, H., Harjumaa, M. (2009) Persuasive systems design: Key issues, process model, and system features. Communications of the Association for Information Systems. 24(1), 28, pp. 485-500.
6. Fogg BJ. Behavior model for persuasive design. Persuasive '09: Proceedings of the 4th International Conference on Persuasive Technology. 2009;40:1-7.