

## WCT FINAL ONLINE EVENT | KEYNOTE

The Leibniz ScienceCampus Tübingen “Cognitive Interfaces” investigates how the design of interfaces affects cognitive processing. One of the hottest topics in this field is the question whether learning can be facilitated by the inclusion of game elements in an interface. Kristian Kiili has been a pioneer in the field of digital game-based learning, and in this online event he will share his insights about the promises and perils of educational games.



**Kristian Kiili, Tampere University of Technology, Finland**

**“Cognitive and Affective Outcomes of Digital Game-based Learning: Seeking for Evidence-Based Design Principles”**

### Abstract

According to recent meta-analyses digital learning games can be effective learning solutions (Wouters et al., 2013; Clark, Tanner-Smith, & Killingsworth, 2016), but surprisingly the analysis conducted by Wouters et al. (2013) revealed that digital game-based learning (DGBL) does not engage and motivate students more than traditional instructional methods. This is against our common beliefs about motivational power of games and likely rooted on conceptual considerations and myths instead of robust empirical research. On the other hand, it has been argued that the poor integration of instructional and game design principles is common and undermines the usefulness of DGBL. The problem is that game-based learning as a research field is still in its early stages and lacks a scientifically proven theory that guides the research efforts. Thus, it is crucial to investigate how different characteristics of games influence on cognitive and affective outcomes of DGBL and to identify scientifically proven design principles for DGBL. In this talk we will explore the science of DGBL in a critical but also in a pragmatic way. We will consider the ingredients of DGBL through theoretical lenses and several scientific studies particularly in the area of game-based math education. The topics of discussion will include DGBL design principles, cognitive and affective outcomes of DGBL, and DGBL analytics. Overall, the attendees will gain a mindset for evaluating DGBL solutions and interventions more critically.

Clark, D. B., Tanner-Smith, E. E., & Killingsworth, S. S. (2016). Digital games, design, and learning: A systematic review and meta-analysis. *Review of educational research*, 86(1), 79-122.

Wouters, P., Van Nimwegen, C., Van Oostendorp, H., & Van Der Spek, E. D. (2013). A meta-analysis of the cognitive and motivational effects of serious games. *Journal of educational psychology*, 105(2), 249.

### **Bio Sketch**

Kristian Kiili received his PhD from Tampere University of Technology, Finland, in 2006. He is a professor of game-based learning at Tampere University (Faculty of Education and Culture). Prior to his current post, he headed TUT Game Lab research group in Tampere University of Technology. He has over 15 years of experience from game-based learning field and he holds the title of docent in user centered design. He has published over 100 peer-reviewed articles and results of his research have been applied also in award-winning learning products. Kiili has been a visiting scholar at Stanford University for 20 months. Currently, his research focus on game-based math learning and assessment, teaching of educational game design, emotional engagement, and pedagogical agents.