Editorial

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Biographical notes: Scotty D. Craig is currently an Assistant Professor in the Department of Technological Entrepreneurship and Innovation Management, Cognitive Science and Engineering Programme at Arizona State University. He is an expert in cognitive psychology and the learning sciences (specifically learning technology). He has published widely in the learning sciences within the intersecting areas of psychology, education, and technology. He is currently on the editorial board for the *International Journal of Learning Technology*.

G. Tanner Jackson is an Assistant Research Professor in the Learning Sciences Institute at Arizona State University (since completion of this special issue, he has accepted a position as a Research Scientist at Educational Testing Service). His research in the cognitive and learning sciences focuses on human-computer interactions with intelligent learning environments. He is particularly interested in natural language systems and game-based learning and assessment. He has published extensively within research communities at the intersecting areas of psychology, education, and technology.

Robert G.M. Hausmann is currently employed as a Cognitive Scientist at Carnegie Learning, Inc. One of his responsibilities as a Cognitive Scientist is to create cognitive models that control the hints, skills, and various interactions within the cognitive tutor. When he is not creating cognitive models, he attempts to bring together scientists from cognitive psychology, computer science, and the learning sciences. The special track on Intelligent Tutoring Systems at the Florida Artificial Intelligence Research Society is the best example of that pursuit.

Intelligent tutoring systems (ITS) are increasingly being used in a wide range of educational settings to enhance student learning. They are also frequently used as platforms for research in education, psychology, and artificial intelligence. ITS can assess a wide variety of learner characteristics and adapt instruction according to principles of learning. Their effectiveness derives from their ability to provide detailed guidance to learners and to adapt promptly to individual learners' needs that are tracked at a fine grained level. Examples of such technologies include (but are not limited to) environments for guided inquiry learning, environments for collaborative problem solving or discussion, natural language processing and dialogue in tutoring systems, modelling and shaping affective states, interactive simulations of complex systems, ill-defined domains, and adaptive educational games.

The publications within this special issue were collected from among the many exceptionally papers presented in the special track on ITS research at the Florida Artificial Intelligence Research Societies (FLAIRS, http://www.flairs.com/) annual conference. The Florida AI Research Society was founded in 1987 to promote and advance Artificial Intelligence within the State of Florida, including interaction between researchers at the various colleges, universities, and industry. The highly successful ITS track was established in 2009 to promote the innovative use of artificial intelligence with computerised tutoring systems.

The current papers are presented as examples of how researchers in the area of ITS are pushing the traditional boundaries in three areas: Interactivity and engagement, knowledge sequencing, and tutorial dialogue. In our opening article, Jackson et al. provide an example of increasing student engagement within a traditional ITS. In their paper, educational games were incorporated into intelligent tutoring in the ISTART-me system that teaches self-explanation skills. In our second article, Champaign and Cohen presented an algorithm to improve the reasoning behind the sequence of student presented content. The last three articles provide insight into the importance of dialogue during tutoring. Roscoe et al. sets forth an algorithm for implementing more complex formative feedback into a writing tutor as well as a methodology to test it. Mitchell et al. expands on the implementation of natural language dialogue area within ITS. In this paper, they investigate predictive models that adapt the systems tutorial dialog based on learner characteristics such as knowledge level and self-efficacy. The final paper by Ward and Litman also deals with manipulation of the tutorial dialogue. This paper investigates the interconnectedness of motivation, existing knowledge levels, reflective text, and overall student learning within the system. Overall, these papers represent a selection of the types and high quality of papers presented at the FLAIRS track on ITS.