Foreword

Serious games and simulations offer the opportunity to realize the full range of current theories of learning. Over the past half century, formal education has gradually broadened its span of instructional strategies. The behaviorist psychological theories from the first part of the 20th century promoted presentational/assimilative teaching coupled with drill-and-practice exercises. In successive waves, cognitivist, constructivist, and situated pedagogies based on alternative psychosocial theories of learning have expanded the types of teaching that students experience (Dede, 2008). In their modern form, all of these approaches emphasize learning as an active process in rich contexts that promote collaboration, engagement, and transfer and that provide sophisticated feedback based on formative, diagnostic assessment (National Research Council, 2000).

However, these powerful forms of teaching/learning typically have not altered conventional classroom practices, even though their practicality and effectiveness in academic settings is proven (National Research Council, 2005). At every level, education lags behind other sectors of the economy in its speed of innovation and its use of information technology. Experts in business have speculated that a *disruptive* technology may soon overcome the forces in schooling that resist change (Christensen, Horn, & Johnson, 2008). Disruptive technologies initially develop outside their context of application but eventually become so powerful that they transform practices in that context. An example is microcomputers, which in the mid-1970s were purchased primarily by hobbyists, but which by the 1980s had displaced the minicomputers entrenched in corporations.

In education, serious games and simulations may serve as a disruptive technology. As the chapters in this book document, this educational strategy has developed outside of formal education environments, synthesizing insights from other sectors such as simulation in the military, motivation in the entertainment industry, visualization in the sciences, thinking from cognitive science, and collaboration from the field of communications. As the authors in this volume delineate, the ability of serious games and simulations to enhance learning, motivation, and transfer lies not in their usage of technology (which serves as a catalyst and enabler) but instead in their ability to encompass—when well designed—powerful theories of engagement and learning (Dede, 2009). Serious games and simulations also provide powerful ways of building on the learning styles and strengths of many digital-age students, developed outside of academic settings through their activities in entertainment, communication, creative expression, and knowledge sharing (Dieterle, 2009).

Further, the potential of serious games and simulations for disruptive transformation of education goes beyond improving the process of teaching and learning. Numerous recent reports have documented the urgency of shifting the objectives and content of schooling to meet the emerging challenges of the 21st century worldwide, knowledge-based economy (e.g., Business-Higher Education Form, 2005; Levy

& Murnane, 2004; National Academy of Sciences, 2006; Organization for Economic Co-operation and Development, 2004). All of these calls to action agree that recentering schooling on 21st-century skills is vital to ensure a desirable global future. Serious simulations and games offer a powerful platform for the inculcation and development of sophisticated 21st-century skills in academic settings. Parallel to 21st-century work, these interactive media provide a context for teaching in which knowledge is situated and tacit, problem finding is central to problem solving, and formative assessment is sophisticated and unobtrusive (Dede, in press).

This book is at the nexus of important innovations in the process and content of education that may transform current models of schooling to better prepare students for the challenges and opportunities of the 21st century. However, as the authors describe, realizing the full potential of serious games and simulations will require overcoming difficult issues in design, implementation, and research. It is truly an exciting time to be part of this (r)evolution…

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