Preface

Virtual worlds are an area of growing interest in many sectors, including higher education. In this realm, with postsecondary enrollments rising, colleges and universities are faced with providing meaningful opportunities for students at a distance from traditional campus settings. While myriad Web-based tools have existed for years to help deliver course content, these tools have not traditionally provided means for creation of community with the imbedded communication and collaboration necessary for successful teaching and learning. Virtual worlds provide a unique opportunity in this area to embrace Vygotsky's (1978) tenets of social constructivist learning and creation of communities of practice (Wenger, 1998). This opportunity can be easily wasted, however, as institutions base their design of these more socially constructed virtual learning environments on more traditional, didactic practice. It is important when designing and implementing three-dimensional (3D) immersive worlds in education to thoughtfully consider constructivist learning models, and the ways in which they can be most effectively utilized to leverage the power of these unique technology tools.

There is a growing body of literature available on constructivist applications of online learning. Few of these, however, discuss the potential of virtual worlds in this context, but the basic tenets are easily transferable. Shea et al (2002) note that a sense of shared purpose, trust, support, and collaboration—i.e., a sense of community—is an essential element in the development of quality online learning environments. Online learning community may be established through effective instructional design and organization, the facilitation of productive discourse, and helpful direct instruction, all components of teaching presence. A study by Liu et al. (2007) showed significant relationships between sense of community and perceived learning engagement, perceived learning, and student satisfaction with online learning experiences. Positive relationships were also shown between feelings of belonging to the community and social presence in the online courses. Another study of online course work by Lee et al. (2006) shows that students cite community-centered approaches to learning and establishment of a constructivist learning environment as essential for building community during the course experience. In this work, we attempt to bring together literature and effective examples of the types of constructivist experiences currently being used in virtual worlds, and note best practices which can serve as examples for those hoping to move in this direction.

OBJECTIVES AND MISSION

The objective of *Teaching and Learning in 3D Immersive Worlds: Pedagogical Models and Constructivist Approaches* is to examine successful implementation of social constructivist instructional design tenets in 3D virtual immersive environments. The authors of each of the included chapters have shared best

practices, challenges, and advice to those working to utilize virtual environments in higher education and other venues. As a reader, we hope you will gain both a research background in the use of virtual worlds for teaching and learning and practical advice as you begin to design and implement these environments.

Teaching and Learning in 3D Immersive Worlds: Pedagogical Models and Constructivist Approaches fills a need in existing resources – bringing together both literature and examples from practice of the design and implementation of constructivist learning models to fully begin to utilize the potential of 3D virtual immersive worlds. This work draws upon a growing research base of those using these environments in education, and provides models from which others may learn. Additionally, a unique characteristic of this work is that it focuses solely on constructivist models of teaching and learning: the utilization of 3D immersive technologies to create communities of practice within learning environments.

PROSPECTIVE AUDIENCE

The primary audience for this publication is educators with an interest in leveraging virtual world technologies for effective teaching and learning. These include educators and trainers in higher education, K-12, and corporate training environments. Furthermore, the most important potential use of this book is as reference and guide to those wishing to design virtual teaching and learning environments for constructivist experiences. Those most interested in this use may include professors and teachers, graduate students, instructional technology support personnel and corporate trainers.

CONTENTS OF BOOK

Teaching and Learning in 3D Immersive Worlds: Pedagogical Models and Constructivist Approaches is divided into five distinct sections. *Section One* focuses on the philosophical foundations and constructivist design of virtual worlds and includes three chapters addressing affordances of 3D immersive environments, learning space design, avatars and identity, and immersion.

Chapter One, titled "*Moving to the World^{virtual}: Affordances of 3D Immersive Environments for Teaching and Learning*," addresses the comparisons often made between online teaching and learning vs. instruction in brick and mortar classrooms. The authors contend that this comparison is invalid and that online teaching and learning, especially that which occurs in virtual worlds, is qualitatively different from face-to-face instruction and provides affordances unique to constructivist teaching.

Chapter Two, titled "*Learning as Immersive Experience: Learning and Teaching Practices in Virtual Worlds*," examines findings in studies that identify key components of efficacy in an immersive learning experience. The chapter focuses on four unique characteristics of 3D immersive learning environments: personalization through learner modeling, integrative feedback, intrinsic motivational quality, and social interactive learning, and how these features can guide the design and future study of immersive environments.

Chapter Three, titled "*Relating Pedagogical and Learning Space Designs in Second Life*," discusses an empirical study conducted on the design of learning spaces in Second Life. The authors identify basic guiding principles to consider when designing 3D learning spaces and activities that are intended to foster students' socialization, informal learning, collaboration, and creativity.

Section Two includes three chapters focused on the role of presence as it relates to pedagogy, and addresses issues related to immediacy, interdisciplinary collaboration, and the role of the academic library in supporting learners in virtual environments.

Chapter Four, titled "*In the Presence of Avatars: What Makes Virtual Teachers and Learners Seem (Un)Real?*" provides a broad overview of issues related to presence by exploring notions of presence and immediacy in immersive environments such as Second Life. Drawing on decades of research on presence in communication and education, the authors of this chapter discuss ways in which current research in immediacy behaviors may help educators enhance the sense of social presence when teaching in a virtual world.

Chapter Five, titled "*Developing Educational Leadership in Graduate Students through Cross-Program Collaboration in a 3D Immersive Environment*," examines the use of a 3D immersive learning environment to create interdisciplinary collaborative experiences for graduate students learning about leadership. The authors of this chapter describe a case study in which graduate students in school administration, library science, and instructional technology were required to work outside their programmatic silos to expand their perspectives and understandings of the roles that each can play in terms of shared leadership.

Chapter Six, titled "*At the Intersection of Learning: The Role of the Academic Library in 3D Environments*," provides readers with a framework for planning and implementing library services as an integral part of any 3D immersive learning environment. The chapter authors discuss, in particular, the role of presence in terms of library services to meet the needs of online communities of practice.

Section Three is dedicated to Activity Theory and includes three chapters focused specifically on active teaching, identify formation, and telecollaboration.

Chapter Seven, titled "*Design of a Learning Activity in Second Life: Active Teaching of Social Educators*," examines the use of Second Life in the teaching of health professionals about disabilities. Using Activity Theory as a theoretical lens, the authors of this chapter discuss how a virtual space can be designed to actively engage students in social activities around health issues.

Chapter Eight, titled "*Communication through Avatars in E-Learning Contexts*," presents a study in how virtual world avatars contribute to the development of identity groups within the framework of collaborative and constructivist student projects. The author of this chapter examines how the use of proxemics and gestures of avatars impact the nature of communication among students in a virtual word, and suggests ways in which the findings of this study might influence ways in which educators design virtual constructivist learning environments.

Chapter Nine, titled "*Analyzing the Design of Telecollaboration in Second Life Using Activity Theory*," focuses on a specific project undertaken in which students from four universities participated in a telecollaboration project facilitated through Second Life. Using the Activity Theory model, the authors discuss how the affordances of Second Life were utilized to address the diverse needs of the participating students in terms of motivational objectives.

Section Four comprises four chapters that discuss several other constructivist models that extend beyond the sections included above. These chapters address the themes of working with Millennials, collaborative design, immersive storytelling, and problem-based learning.

Chapter Ten, titled "*Playing in a New Key, in a New World: Virtual Worlds, Millennial Writers, and 3D Composition*," presents findings based on Rouzie's "serio-ludic" pedagogy that address Millennials' distrust of certain approaches to learning activities. The author offers suggestions to help educators overcome challenges in designing virtual worlds for this particular set of learners, advice related to orienting new students, discussion of existing quality content in Second Life, and guidelines for designing virtual learning spaces.

Chapter Eleven, titled "*3D Collaborative Virtual Environment to Support Collaborative Design,*" reports the findings of a study in which students' engagement within a Collaborative Virtual Environment (CVE) was compared to students engaged is similar tasks as individuals. Using a design tool developed

by the authors for this study, the authors discuss their findings that students working to collaboratively design a virtual building were faster than their colleagues working individually.

Chapter Twelve, titled "*Learning Language through Immersive Story Telling in a 3D Virtual Environment*," presents an exploratory study in which *Kingdoms*, a virtual learning environment, was used to facilitate elementary school students' learning of Chinese. The case study discussed comprises an immersive learning environment rich in Chinese cultural artifacts based upon constructivist learning theory, game-based learning principals, and Enter-the-Story method.

Chapter Thirteen, titled "*The Introduction of a Problem Based Learning Approach to the Implementation of a Virtual Reality Context*," presents findings from an initiative in which a Problem-Based Learning (PBL) activity was employed in the context of a virtual learning environment. The authors of this chapter contend that virtual reality can be used to create a context for challenges and issues that might arise in the workplace, and that PBL can be used as a valuable means of introducing students to and engaging them in developing solutions to the real world challenges that they may encounter in such a workplace.

Section Five includes three chapters offering new ways of thinking about constructivist pedagogy in 3D virtual worlds. The first of these suggests a new learning theory, Ecology of Culturally Competent Design. This chapter is followed by a chapter that discusses new ways in which the Zone of Regulatory Development can be applied to virtual learning environments. Finally, the last chapter suggests a model of constructivist learning based on a Katamari style learning environment.

Chapter Fourteen, titled "*Contemporary Theory for Immersive Worlds: Addressing Engagement, Culture, and Diversity*," suggests that most contemporary learning theories predate applications of multimedia in learning and are subsequently lacking in terms of guiding the design and development of learning spaces in virtual worlds, especially in terms of addressing issues of culture and diversity. In response, the authors have developed a new learning theory, *Ecology of Culturally Competent Design* as a means of addressing the challenges of situating culture in the design of virtual learning environments.

Chapter Fifteen, titled "*What are Avatars Made of? Fictive Worlds and the Zone of Regulatory Development*," discusses the shift from virtual worlds as the realm of gamers to worlds in which educational leaders and policy makers are establishing a presence in terms of teaching, learning, and research. The author of this chapter discusses this ongoing trend and the theoretical grounding upon which this shift is occurring, in particular, in terms of Zone of Regulatory Development, identity, and situativity.

Chapter Sixteen, titled "*Worlds in the Making: Embedded Post-Constructivism, Katamari-Style Learning, and the Secret Life of Software*," engages the reader in a philosophical analysis of the ontological status of constructivism in the context of 3D virtual worlds as collaborative learning environments. The author introduces the idea that the immersive 3D console-game *Katamari* can be used for educators to understand and subsequently design learning spaces that are generative and capitalize on the reproductive, comingled nature of these spaces.

In total, these sixteen chapters provide in depth overview of a wide variety of pedagogical models and constructivist approaches to further our collective understanding of teaching and learning in 3D immersive worlds.

CONCLUSION

As virtual worlds become more commonly used in higher education settings, various publications have emerged to address the design and development of these worlds. However, the titles previously available

have proven insufficient to tackle the many issues and challenges educators and instructional designs face when planning to create a virtual world used for teaching and learning. These titles have been limited in their scope and coverage of the full range of possibilities. Several are already obsolete in this quickly changing field; others focus more on the history and physical design of virtual worlds; while others are narrow in their coverage of virtual worlds or applications, limiting discussion to specific environments such as Second Life or to a single case study. Furthermore, we believe that great potential exists in the application of constructivist principles in the design and development of 3D immersive learning environments, and that a vehicle to bring together the ideas of other likeminded educators and researchers was necessary to further this shared belief. We hope that this book, *Teaching and Learning in 3D Immersive Worlds: Pedagogical Models and Constructivist Approaches,* will contribute a much-needed perspective on the design of instruction for a wide variety of virtual worlds through its coverage of a variety of constructivist instructional strategies, methodologies, and pedagogies appropriately adapted to such an environment.

Collectively, these sixteen chapters provide an unprecedented comprehensive perspective of how constructivist principles and pedagogical approaches have been and can continue to guide the design of teaching and learning experiences in 3D immersive learning environments or virtual worlds. It is evident in reading the chapters described above that these learning environments, regardless of the specific platform used to create the environment, have significant potential in not only shaping the learning experience, but also completely changing how we approach our design of teaching in virtual worlds.

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