BOOK REVIEW
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Theoretical Foundations of Learning Environments, Edited by David Jonassen and Susan Land

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INTRODUCTION

Although constructivism or constructivist learning approaches have been favored over other learning theories since the 1990s, we still see many instances of traditional instruction delivered at different levels of our education system. Many instances of online courses today, for example, are simply copies of face-to-face courses in online settings. Course readings are basically translated into PDF documents and uploaded into a learning management system, and students are tested based on those readings. In many of those courses that provide discussion opportunities, students are mostly left alone by themselves and are expected to construct knowledge through discussion without any or with limited instructor interaction. It is not uncommon to find people (e.g. educators, instructional designers) who can discuss the importance of student-centered learning and how constructivist approaches facilitate student-centered learning. However, when it comes to designing a student-centered learning environment in real life, the traditional approaches are adopted. One of the reasons behind this paradox may very well be inadequate knowledge on how to design student-centered learning environments (SCLE). *Theoretical Foundations of Learning Environments* is a good resource that provides readers with a collection of learning theories that are constructivist in nature. It is divided into three sections, with chapters targeting different theoretical perspectives for designing and analyzing student-centered learning environments.

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OVERVIEW

The first chapter, written by Land, Hannafin, and Oliver, sets the stage for the rest of the book. It comprises a well-written overview of the theoretical underpinnings (e.g., assumptions, methods, tools, etc.) of SCLE. This chapter should be considered as a reference point where readers can get a quick snapshot of SCLEs. Specifically, the section where the authors categorize SCLEs can be very beneficial for those seeking examples of different SCLE types. The examples of games and virtual worlds, Civilization III (game/simulation), Crystal Island (virtual worlds), and Scratch (gaming tool), present the book as an up-to-date resource for educators and instructional designers since virtual environments and online games have more recently become very popular in educational settings.

In today's world, individuals should have the ability to solve practical problems, be collaborative and social, and be able to share knowledge and experiences within their communities. In Chapter 2, "From Practice Fields to Communities of Practice," Barab and Duffy argue that common teaching practices in schools are mostly decontextualized so that students do not practice or find a chance to practice what they learn in their external communities. In this chapter, they discuss how practice fields and communities of practice can be utilized to remedy decontextualized education. Yet, they argue that "practice fields" may not solve this issue truly since "the practices that the learner engages in are still 'school tasks' abstracted from the community" (p. 38).

We will outline the Chapters 11 and 12 together with Chapter 2 because they are also related to learning communities and communities of practice. The focus of Chapter 11, "Learning Communities: Theoretical Foundations for Making Connections," is on learning communities in general. Specifically, in Chapter 11, Hill discusses what learning communities are, theories that can be associated with learning communities, how learning communities can be built, and issues and challenges that one faces when building learning communities. While discussing the strategies and techniques related to building learning communities, the author tries to incorporate different theories and show how those theories should be supported in a learning community. The author tries to link Web-based instruction and online community in the conclusion section, but we found it relatively short and separated from the text. In the next chapter, Hoadley elaborates on communities of practice and provides readers with a discussion of differences between communities of practice and other knowledge communities. As with many other learning environments, technology plays a crucial role in supporting communities of practice. The author lists four techniques in which technology can be used to support communities of practice: (a) linking others with similar practices, (b) providing access to shared repositories, (c) supporting communications within a community, and (d) providing awareness of the context of information resources. Under each of these techniques, the author discusses how technology can be used to facilitate these processes. Overall, we think these three chapters offer an in-depth look at learning communities and communities of practice.

Chapter 3, "Designing Model-Based Learning Environments to Support Mental Models for Learning," targets model-based and model-oriented learning environments and provides seven design principles for creating model-based learning environments. Pirnay-Dummer, Ifenthaler, and Seel first discuss mental models by describing an interesting scenario in which traffic lights in an imaginary country work in a way that conflict with what we are accustomed to. In such a situation, of course, an immediate adaptation of our mental models would be required for better reasoning and decision making. The authors point out that to design learning environments that are interactive and working, the model that depicts the target learning goals should be considered in the design process, and learners should be provided with opportunities where they can

question their mental models and explain the changes in their worlds. Although we found this chapter not as easy to synthesize, it still provides a good theoretical overview of model-based learning environments.

In Chapter 4, "Conceptual Change and Student-Centered Learning Environments," Jonassen and Easter elaborate on conceptual change and the types of learning environments that foster conceptual change. When our existing conceptual frameworks or cognitive structures are not sufficient to understand the world or some phenomena around us, we may need to modify or add to what we know so that we can reach a satisfactory cognitive state. Authors call this process a "conceptual change." Depending on the pace of the change in conceptual frameworks, authors define two types of conceptual changes: rapid and evolutionary. Additionally, they discuss theories of conceptual change that consider other factors such as motivational and emotional. An interesting part of this particular chapter is the section where Jonassen and Easter discuss different types of learning environments and how conceptual change can be fostered in such environments. For example, simulations can foster conceptual change if learners enter the learning environment with a hypothesis to test, elaborating on the results to explain the discrepancies/similarities between their hypotheses and actual results. Other examples of learning environments mentioned in this chapter are model building and argumentation.

In the fifth chapter, "Argumentation and Student-Centered Learning Environments," Nussbaum provides an in-depth explanation of argumentation and its use in SCLEs. Argumentation can be a powerful instructional tool, if implemented properly, because by arguing, people evaluate their own reasoning, possibly resulting in conceptual change. The author also addresses other key issues (e.g., amount of scaffolding or structure) that instructional designers have to consider when designing pedagogically sound learning environments based on argumentation.

The sixth chapter, "Theory and Practice of Case-Based Learning Aids," gives an overview of case-based reasoning (CBR), discusses its implications for student-centered learning, and provides readers with examples of software to support case-based learning. This chapter by Kolodner, Dorn, Owensby Thomas, and Guzdial starts with describing CBR as a model of cognition, which sets the theoretical background for implementing CBR as a learning aid. Further, authors briefly discuss two CBR-driven approaches (goal-based scenarios and learning by design) that can be used to sequence instructional activities in a learning environment. Also, they provide a list of suggestions to create learning environments that are effective and utilize CBR in their core. We found these suggestions beneficial for the development of valuable learning experiences.

Chapter 7, "Metacognition and Self-Regulated Learning in Student-Centered Learning Environments," by Azevedo, Behnagh, Duffy, Harley, and Trevors, introduces self-regulated learning (SRL) in SCLEs. The authors also discuss the theoretical framework for SRL including but not limited to information-processing theory of self-regulated learning, monitoring processes, and how those processes are associated with self-regulation. Additionally, they provide readers with four examples of SCLEs that support students' self-regulated learning. We think that the conclusion section would be a good starting point for those doctoral students who have an interest in self-regulation and who are trying to narrow down a dissertation topic.

One of the common arguments concerning formal learning environments is that students learn things out of their original context and as a result have problems when it is necessary to transfer skills and knowledge to deal with similar problems/issues in other situations. Several chapters in this book refer to this problem and provide insights from different perspectives (e.g., learning communities, case-based reasoning, etc.). In Chapter 8, "Embodied Cognition and Learning Environment Design," Black, Segal, Vitale, and Fadjo emphasize that

learners need richer perceptual learning experiences so that they can easily acquire mental perceptual simulations of the things being learned. When this is accomplished, learning experience will be transferable rather than decontextualized. This chapter details specific examples for different types of gestural interfaces and how these can promote learning and thinking.

In Chapter 9, "Everyday Expertise: Learning Within and Across Formal and Informal Settings," Zimmerman and Bell demonstrate a theoretical framework for everyday expertise and several showcases of using the framework for designing learning environments. Although they argue that the framework can be used for both formal and informal learning environments, their focus in this chapter is how to use this framework to design and develop informal learning environments where learners can have a learning experience at different dimensions (i.e., individual, social, and cultural).

Chapter 10, "Activity Theory in the Learning Technologies," by DeVane and Squire, provides a snapshot of the history of activity theory, its characteristics, and caveats. Further in the chapter, the authors discuss how activity theory can be used within learning technologies providing specific scenarios for using activity theory as a framework when designing learning interventions. This chapter may be a good starting point for those who are interested in activity theory and its uses for designing learning environments.

Finally, in Chapter 13, "Learning Environments as Emergent Phenomena: Theoretical and Methodological Implications of Complexity," Jacobson and Kapur talk about complex systems and how conceptual perspectives and methodologies that are being used to study complex systems can be incorporated in the learning sciences to study learning environments. The authors' argument is based on the idea that any environment in which learning occurs is a complex system with many properties and processes. Therefore, those conceptual perspectives and methodologies developed to study complex systems may be adapted to inform research focusing on the learning environments.

CONCLUSION

Even though this book provides a good collection of contemporary learning theories for those who are interested in learning more about student-centered learning approaches, it has several limitations. First, this book may not be appropriate reading material for those who are new to the field of instructional technology, as some chapters contain complex information and an abundance of theoretical terms. Second, it would be nice if this book also had a chapter that specifically discussed how online learning environments should be designed to foster student-centered learning.

Overall, *Theoretical Foundations of Learning Environments* contains a thorough collection of learning theories related to the design of SCLE. Aside from theoretical explanations, the examples of how these learning theories are incorporated into the design of SCLE make this book a strong resource for educators and instructional designers. The examples demonstrate how these learning theories can be effectively used to design learning experiences in real life. We recommend this book as a resource for instructional designers, educators, and curriculum specialists who seek an updated view of theoretical foundations that are constructivist in nature.