

Chapter 10

Empowering Digital Learners: A Self-Managing Learning Process Framework for Digital Game- Based Learning System (DGBLS)

Wenhao David Huang

University of Illinois at Urbana-Champaign, USA

Dazhi Yang

Boise State University, USA

ABSTRACT

Motivation drives our learning behaviors. Our abilities to intentionally control our motivation to learn, however, remain largely limited because motivation is a subliminal and synthetic mental state derived from the interactivity between our prior experiences and the learning environment. In a digital game-based learning system (DGBLS), learners are always bombarded by a colossal amount of cognitive, social, and affective stimuli that afford and affect the interactivity, which can easily trigger learners' motivational responses and leads to the consequences of not being able to manage their motivation. As a result the intended learning processes can be interrupted. Although learners cannot control their motivation in this case, they can manage their interactivity with the DGBLS to select and process stimuli that are relevant to the learning tasks. Therefore this chapter intends to propose a process framework to empower learners to autonomously manage their interactivity with the DGBLS in order to stay focused on the learning tasks. Specifically this framework will draw literatures on learners' motivational processing and cognitive processing pertaining to learning in the DGBLS.

DOI: 10.4018/978-1-61350-441-3.ch010

INTRODUCTION

The digestive process of humans is a complex process. Numerous chemical and physiological elements must be mixed properly in order to help us digest our food intake effectively. As a result, we might feel hungry, which is a common experience among us. The occurrence of such sensation and the digestive process, however, are out of our conscious control. We cannot tell our bodies when to feel hungry. Luckily we do know how to respond to such physiological signal. When we are hungry, we respond with eating. But there is more to the “eating” part of the digestive cycle. In order to stay healthy, we should monitor when we eat, what we eat, and how we eat. In other words, we should manage our eating behaviors in response to the feeling of hunger. If we eat whatever we want whenever we are hungry, after a while our digestive systems might not be able to handle the unregulated (and often abusive) processes. Just by looking at all those dieting and fitness publications on a magazine stand has illuminated the fact that we actually “can” manage our eating behaviors with many proven strategies.

Interestingly the relationship between motivation and learning behaviors is strikingly similar to the connection between feeling hungry and eating. Feeling motivated is analogous to the sensation of hunger; learning behaviors stimulated by motivation parallels with eating activities that intake and process information. This comparison implies two possibilities when viewing the relationship between motivation and learning. First is that excessive motivational stimuli can interrupt the intended learning process by overloading learners’ cognitive processing capacity. Second, it is possible to manage learning processes via proven strategies.

Learning processes interrupted by excessive motivational stimuli are prone to occur in Digital Game-Based Learning Systems (DGBLS) where learners are immersed in and often overwhelmed by enhanced interactions, enriched multimedia

presentations, and explicit extrinsic performance incentives (Huang, Huang, & Tschopp, 2010). DGBLS are known for providing abundant of stimuli to motivate learners. Current bodies of literature, however, are lacking in enabling learners in DGBLS to effectively manage their learning processes while playing in the game-based environment. To address this motivational-cognitive overloading issue, we assert that although we cannot consciously control our motivation as a psychological state derived from complex internal processing, we still can manage our learning behaviors in DGBLS with planned processes. These processes should be based on proven learning theories and instructional design models with specific focus on motivational and cognitive processing because motivation drives cognitive learning in DGBLS.

The following sections will first examine existing literatures relevant to DGBLS, motivational design, cognitive processing, and integrative approaches in understanding the relationship between motivation and cognition in digital game environments. Secondly we will propose a process framework to help digital learners manage their learning processes in DGBLS by synthesizing reviewed design models and theories. The final section will conclude our chapter by proposing a research agenda.

BACKGROUND

In this section we first review literatures on learning motivation and cognitive learning. We also discuss relevant instructional design models to put those theories in the context of designing actual learning processes. The second part discusses design models for DGBLS that have specific emphasis on motivational as well as cognitive processing. Finally a review of additional DGBLS design heuristics concludes this section.

18 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/chapter/empowering-digital-learners/61690

Related Content

Obstacles Encountered by Learners, Instructors, Technical Support, and Librarians

Badrul H. Khan, Laura J. Cataldo, Ruth Bennet and Salvatore Paratore (2007). *Flexible Learning in an Information Society* (pp. 306-319).

www.irma-international.org/chapter/obstacles-encountered-learners-instructors-technical/18716

Unconstrained Walking Plane to Virtual Environment for Non-Visual Spatial Learning

Kanubhai K. Patel and Sanjay Kumar Vij (2012). *Constructing Self-Discovery Learning Spaces Online: Scaffolding and Decision Making Technologies* (pp. 199-217).

www.irma-international.org/chapter/unconstrained-walking-plane-virtual-environment/61306

A Theoretical Framework for Serious Game Design: Exploring Pedagogy, Play and Fidelity and their Implications for the Design Process

Pauline Rooney (2012). *International Journal of Game-Based Learning* (pp. 41-60).

www.irma-international.org/article/theoretical-framework-serious-game-design/74746

Videoconference, Audioconference, and Video Chat

Richard Caladine (2008). *Enhancing E-Learning with Media-Rich Content and Interactions* (pp. 210-233).

www.irma-international.org/chapter/videoconference-audioconference-video-chat/18327

Cognitive Modeling of Learning Using Big Data From a Science-Based Game Development Environment

Leonard Annetta, Richard Lamb, Denise M. Bressler and David B. Vallett (2020). *International Journal of Game-Based Learning* (pp. 22-39).

www.irma-international.org/article/cognitive-modeling-of-learning-using-big-data-from-a-science-based-game-development-environment/262195