Chapter 4
Massively Multiplayer Online Games as Spaces for Metacognition and Self-Regulated Learning

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ABSTRACT

Metacognition, or the ability to be consciously and intentionally aware of one's thinking and the ways in which one's thinking impacts one's learning, has been shown in the research to be a critical component of learners' abilities to learn effectively. One area of research on metacognition has focused on the role of metacognition in video games, specifically in massively multiplayer online games, known as MMOs. Through examples of metacognition in a popular video game such as World of Warcraft or in Adventure Academy, a new educational MMO for children ages 8–13 years old, this chapter highlights the ways in which MMOs can act as spaces that support the development of metacognitive behaviors through the components of planning, monitoring, control, and evaluation, toward improving learning overall.

INTRODUCTION

Despite decades of progress in increasing the academic performance of students, international assessments consistently report that students in the United States are falling behind (de Brey et al., 2019). As education stakeholders examine the complex issues affecting students' ability to achieve, one area that has received attention is that of metacognition, which is often defined as 'thinking about one's thinking.' This definition is somewhat simplistic and does not effectively describe the multifaceted processes that make up metacognition, including self-knowledge about the ways in which one remembers and learns

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new information, selects and employs strategies for learning, effectively problem-solves, analyzes one's own thoughts, draws conclusions, and makes decisions about what is known, what needs to be known, and how to better know it (Downing & Leung, 2018; Hacker, 2017; Kim, Park, & Baek, 2009). In other words, metacognition is a student's awareness about his or her own thinking and the ability to take appropriate action based on that awareness in order to effectively learn and achieve. A student with strong metacognitive skills has the ability to understand his or her own thoughts and the implications and consequences of those thoughts (Kim, Park, & Baek, 2009). As a result, metacognitively-skilled students are more likely to set rigorous learning goals and employ successful strategies for achieving those goals. They are aware of their learning abilities, are better able to develop and execute plans, employ and devise strategies to improve, and monitor their learning in ways that lead to academic achievement (Callan et al., 2016; Schraw & Dennison, 1994).

Stronger metacognitive skills are associated with improved learning and higher academic achievement (Bryce, Whitebread, & Szücs, 2015; Callan et al., 2016; Downing & Leung, 2018; Sourmelis et al., 2017). For example, one study that evaluated the performance of thousands of 15-year-olds (n = 475,460) on the 2009 International Programme for International Student Assessment (known as the PISA), found that the use of metacognitive strategies was a significant predictor of achievement, and was as predictive as the students' socio-economic status (Callan et al., 2016). Moreover, research suggests that even though not all students demonstrate metacognition, metacognitive behaviors and skills can be taught and improved with training and practice (Downing & Leung, 2018; Dawson, 2008; Schraw, 1998). If metacognition helps students to become better learners, and metacognition can be taught and improved, then learning environments that foster the development of metacognitive skills may provide opportunities to increase student learning and achievement.

Recent research has focused on the development of metacognition in digital environments, including "serious" games and commercial video games (Hacker, 2017). Trends show that student engagement with digital resources continues to increase, both in and out of school (U.S. Department of Education, 2017). Students today are growing up in a world that, for them, has never existed without the internet or learning, playing, socializing, and thinking online. To this can be added the popularity and pervasiveness of video games, which provide simulated virtual spaces where learners can exercise agency, make decisions, and experiment with different ways of learning, thinking, and knowing (Kim, Park, & Baek, 2009). As a result, interest in examining the potential of video games as environments that can develop students' metacognitive skills has grown.

The field of video games is expansive, and not all video games promote the same kind of engagement, thinking, and learning. Massively multiplayer online games (MMOs), in which players explore an open virtual environment to accomplish goals and solve problems, either independently or in collaboration with peers, have received much attention in recent years as spaces that promote critical thinking, problem-solving, and as a result, metacognition (Sourmelis, 2016). A small body of research has sought to explore the ways in which metacognition can be fostered in such simulated online game environments.

This chapter examines the metacognitive behaviors of players in MMOs, a specific type of video game that employs a variety of features that promote self-regulated learning and may also act as spaces that build and strengthen metacognitive behaviors in players. In the sections that follow, the authors will review frameworks for metacognition based on the work of Schraw and Dennison (1994) and Pintrich, Wolters, & Baxter (2000), the relationship between metacognition and self-regulated learning, and the features employed by MMOs that promote self-regulated learning. The authors will share how these frameworks were used in two exploratory qualitative studies, with the second study building on the