Considering Context as it Relates to Student Agency Conditions in Intelligent Game-Based Learning Environments

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ABSTRACT

While existing research has investigated the impact of game design elements such as player agency, little is known regarding how these game design choices further interact with contextual factors to influence learners' outcomes and experiences when learning within GBLEs. This extended abstract will describe results from an ongoing study to argue for an expanded definition of student agency in GBLEs as a fluid assemblage of in-system elements and contextual factors.

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1 Introduction

While game-based learning environments (GBLE) are recognized as engaging instructional tools, they are also intelligent systems and powerful research tools capable of unobtrusively collecting and interpreting fine-grained representations of learners' clickstream actions [1], [5, 6]. For this reason, it is especially important to consider how contextual factors outside the game system may alter the impact of in-game conditions as GBLEs enter applied educational settings. As such, this study will work to incorporate concepts from posthumanism [2, 4] and mobile interface theories [3] to consider the impact of context on learning within GBLEs.

2 Current Study

The current study uses Crystal Island, an intelligent GBLE, to investigate how levels of in-game agency impact students' learning and reported emotions after game play. There are multiple contextual differences that separate the current study from previous iterations, namely that a sizeable portion of our participants identify as students with disabilities and that the study has been run remotely for the first time due to the onset of the Covid-19 pandemic. Prior research on in-game agency conditions found that students in the *Partial Agency* condition exhibited the highest normalized learning gain scores [5, 6] while students in the *No Agency* condition exhibited the lowest levels of frustration, confusion, and joy as measured by facial expressions of emotion [4]. In contrast, early results from the current study show students in the *No Agency* condition are reporting higher levels of post-game enjoyment and curiosity while students in the *Full Agency* condition are exhibiting higher normalized learning scores. These contrasting results suggest that contextual factors may be impacting students' experiences withing GBLEs in meaningful ways.

3 Ongoing Considerations for Learner Agency

Understanding how individuals, spaces, and interface interactions enmesh to shape learners' sense of agency and subsequent learning outcomes in intelligent GBLEs presents a daunting task, but I argue investigations of these factors are an essential precursor to scaled application of GBLEs in real-world learning environments. It's imperative that we proactively engage in interdisciplinary discussions of the assembled factors that may shape educational experiences within AI-driven systems like GBLEs.

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