

Chapter 13

Advancing the Study of Educational Gaming: A New Tool for Researchers

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ABSTRACT

Most of the published research in educational gaming has had methodological limitations. Process data critical to understanding under what conditions games can promote learning are typically not collected, and unreliable student and teacher self-reports are often the primary data source used when assessing the educational efficacy of many games. To address these and other methodological issues, the authors have developed a research software tool, OpenVULab¹, which can record screen activity during game² play in classroom settings remotely and unobtrusively, together with a synchronized audio track of player discussion. This chapter describes the structure, operation, and affordances of the tool and reports on the results of a field trial designed to evaluate its utility. In this trial, 42 college students were studied using OpenVULab as they played a coursework-related web-based learning game. The chapter concludes with an analysis of the trial outcomes, showing how they concretely demonstrate the methodological advantages that the use of OpenVULab offers researchers.

INTRODUCTION

Researchers investigating advanced digital games³ and gameplay as a medium for learning face a number of methodological challenges that, while not unique to this domain of study, are heightened

by the technical and pedagogical complexities of the games themselves and the wide range of potential gameplay practices, strategies, and outcomes possible when they are used by diverse learners in differing contexts. Successful gameplay in genres such as role-playing games, simulation games, and real-time strategy games necessitates the application

DOI: 10.4018/978-1-61520-731-2.ch013

of a range of cognitive and metacognitive skills in the service of learning and problem-solving. In addition, where students play collaboratively, they need to apply social learning skills in support of collective problem solving, social negotiation, and distributed learning (Gee, 2003). The majority of game studies have used teacher and student self-reports as their primary data source, which places serious constraints on their utility. Even when quantitative, experimental, or quasi-experimental designs have been applied to the investigation of educational gaming, it has typically been in studies that address only a narrow set of achievement outcomes that can be readily quantified, that make little attempt to understand critical contextual factors, and that typically do not inquire into the mediating processes of player experience and interpretation or the development of player gameplay strategies.

More recently, game and simulation investigators have begun to make use of richer multi-method research designs that offer greater insight into the differential impacts of specific interface and pedagogical design choices made in a game or simulation and that further our understanding of the player's experiences, play strategies, and learning. However most of these studies still bypass important data sources, as gathering complete data on all aspects of gameplay has traditionally been very labor intensive, requiring the presence of obtrusive video cameras to capture player and screen activity. The associated cost and logistics issues have meant that such studies are typically run over a short time, often out of the students' normal classroom milieu, in specially-equipped labs. To address these limitations, we have developed the Open Virtual Usability Laboratory (*OpenVULab*), a software tool specifically designed to enable researchers to collect a rich set of process and outcome data in such studies, remotely and unobtrusively, in a readily usable form at relatively low cost.

In the following section of this chapter, we further develop the rationale for *OpenVULab*'s

development through a closer examination of the constraints that traditional data collection strategies impose on gaming and simulation studies, and the affordances and limitations of extant software tools (developed primarily for usability studies) which can be used to capture play process data. We then provide an overview of the data collecting, retrieval, and analysis functionalities of *OpenVULab*, discussing the advantages these offer the researcher over other tools and approaches. A more detailed description of *OpenVULab*'s structure and functionality is followed by a summary report on the outcomes of a pilot trial of the tool, in which it was used to study the deployment of a simple learning game in a university freshman course. *OpenVULab*'s utility is then discussed in light of the pilot study experience. The chapter concludes with a brief overview of plans for the further development of the software.

METHODOLOGICAL ISSUES IN GAMING RESEARCH

Historically, the majority of studies of digital educational gaming have relied on teacher and student self-reports of attitudes and perceptions as their sole or primary source of data. Some have used open-ended surveys or interview schedules to probe perceptions about the game and its efficacy as a learning tool, whereas others have collected more quantitative data using Likert-type rating scales. A few have employed standardized evaluation forms for user assessments (e.g., Becta, 2001). Although data of this type is of value in uncovering certain usability issues and in determining attitudes and perceptions, it cannot provide an adequate measure of learning outcomes or gameplay strategies.

Self-reports of all types are known to be subject to halo effects—when participants enjoy an experience, they are more likely to report having learned from it regardless of actual learning (Gosen & Washbush, 2004). In a validation study

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