



**VIRTUAL LEARNING
ENVIRONMENTS**
UNVEILING LEARNING AND IDENTITY

Edited by
Aroutis Foster and Mamta Shah



Virtual Learning Environments

This book provides education scholars insight into current theoretical and methodological approaches to conceptualize, facilitate, and examine learning and identity in virtual learning environments such as games and simulations.

Virtual learning environments (VLEs) are being increasingly designed, implemented, and researched because they offer opportunities for learning that are embodied, enactive (i.e., learning by doing), extended into the learners' environment, and embedded in authentic and potentially valuable contexts for identity exploration. Each chapter in this book uniquely illustrates the learning and identity processes, characteristics, and outcomes that VLEs can facilitate. Together, these approaches provide a foundation for use-inspired research that guides how individuals intentionally, continually, and dynamically reinvent the self for a future that requires flexibility and adaptability in both career and academic spaces.

The volume will be a key resource for researchers, scholars, and practitioners engaged in the interdisciplinary fields of learning sciences, learning analytics, and learning design. It was originally published as a special issue of *The Journal of Experimental Education*.

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Successful Learning Environments Support and Harness Students' Identity-based Motivation: A Primer

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Context, Community, and the Individual: Modeling Identity in a Game Affinity Space

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Facilitating and Interpreting High School Students' Identity Exploration Trajectories in STEM

Mamta Shah, Aroutis Foster, Hamideh Talafian, Amanda Barany, and Mark E. Petrovich Jr.

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Operationalizing Identity – Studying Changing Selves in Experimental Learning Environments

David Williamson Shaffer

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Introduction: Framing and Studying Learning and Identity in Virtual Learning Environments

Aroutis Foster  and Mamta Shah 

ABSTRACT

In a 21st century context of rapid technological advancement, virtual learning environments (VLEs) such as games have been increasingly designed, implemented, and researched for their capacity to offer immersive and interdisciplinary experiences that support student motivation and learning. As such, VLEs have acquired greater mainstream acceptance as tools for learning that is embodied, enactive (i.e. learning by doing), extended into the learners' environment, and embedded in authentic and potentially valuable contexts. However, this domain is still in its infancy and requires research for developing theories of the learning and identity mechanisms occurring in VLEs, evidence-based measurement of these processes, and design principles for virtual learning environments and experiences that promote learners' knowledge, identity processes, and career paths. As such, this special issue of *The Journal of Experimental Education* seeks to provide education scholars with insight into current theoretical and methodological approaches to conceptualize, facilitate, and empirically examine learning and identity in VLEs. It brings together empirical examples of conceptually, methodologically, and analytically well-grounded research to illustrate the learning and identity processes, characteristics, and outcomes that VLEs can facilitate. A guest commentary and an invited theoretical article provide rich takeaways for advancing research and practice in this burgeoning field.

IN A 21ST CENTURY context of rapid technological advancement, virtual learning environments (VLEs) such as games have been increasingly designed, implemented, and researched for their capacity to offer immersive and interdisciplinary experiences that support student motivation and learning (Foster, 2008; Kamarainen et al., 2015). As such, VLEs have acquired greater mainstream acceptance as tools for learning that is *embodied* (Gee, 2003), *enactive* (i.e. learning by doing (Metcalf et al., 2011)), *extended* into the learners' environment (Foster et al., 2019), and *embedded* in authentic and potentially valuable contexts (Shaffer, 2006).

As such, this special issue of *The Journal of Experimental Education* seeks to provide education scholars with insight into current theoretical and methodological approaches to *conceptualize, facilitate, and empirically examine* learning and identity in virtual learning environments (VLEs) such as games, virtual realities, augmented realities, and simulations. In recent years, increasing research has shown VLEs to provide effective contexts for learning and identity exploration through students' enactment of player roles (Barab et al., 2010; Foster, 2011; Khan, 2012; Kafai et al., 2010; Shaffer et al., 2015). From a situative perspective on learning and identity, digital games and virtual worlds support transformation of game-players' knowledge and self through

participation in the gaming activity that involves the whole person in a dynamic individual-environment interaction (Barab et al., 2007; Shah et al., 2017). However, this domain is still in its infancy. It requires research for developing theories of the learning and identity mechanisms occurring in VLEs, evidence-based measurement of these processes, and design principles for virtual learning environments and experiences that promote learners' knowledge, identity processes, and career paths.

In addition, research on science, technology, engineering and mathematics (STEM) education has increasingly referenced ways to develop learner skills in identity exploration, or a student's "deliberate internal or external action of seeking and processing information in relation to the self" (Kaplan et al., 2014, p. 250). Processes of self-directed learning can promote identity changes in targeted directions over time, such as taking steps to attain a future STEM career (Stets et al., 2017). Experiences and methods that facilitate learning as identity exploration are therefore particularly valuable in a 21st and 22nd century context in that they can support adaptive skill development and career preparation for emerging and under-accessed STEM careers (Callahan et al., 2019).

For this special issue, we defined learning and identity in VLEs as the process by which a person engaging in digital gameplay or virtual environment enacts an activity-based identity with the potential to modify the person's learning and identity in this and other domains beyond the VLE (Foster, 2014). We are happy that this special issue is a first of its kind; it includes empirical articles about *Learning and Identity in Virtual Learning Environments*. It brings together empirical examples of conceptually, methodologically, and analytically well-grounded research to illustrate the learning and identity processes, characteristics, and outcomes that VLEs can facilitate.

We received 25 one-page abstracts. After screening them for their alignment with the call for the special issue, authors of 14 proposals were invited to submit full manuscripts. Of these, a total of 10 manuscripts were assigned to the double-blind peer-review process. Most submissions were made in the learning instruction and cognition strand of the Journal of Experimental Education (JXE), followed by motivational and social processes strand, and finally, the measurement statistics and research design strand. Each submission underwent a double blinded peer review process, resulting in the acceptance of 5 manuscripts which are featured in this special issue. The following were accepted in the learning and cognition strand: *Assessing Science Identity Exploration in Immersive Virtual Environments: A Mixed Method Approach* by Reilly et al. (2020); *Influences of Game Design and Context on Learners' Trying on Moral Identities* by Spencer Greenhalgh (2020); and *Spaces of Rebellion: The role of MUVes in Development of Epistemic Identity* by Glassman et al. (2020). *Facilitating and Interpreting High School Students' Identity Exploration Trajectories in STEM* by Shah et al. (2020) was accepted in the Motivational and Social Processes strand. Finally, *Context, Community, and the Individual: Modeling Identity in a Game Affinity Space* by Barany and Foster (2020) was accepted in the Measurement, Statistics and Research Design strand.

We invited David Williamson Shaffer, Vilas Distinguished Achievement Professor of Learning Science at the University of Wisconsin–Madison in the department of Educational Psychology, the Obel Foundation Professor of Learning Analytics at Aalborg University in Copenhagen, a Data Philosopher at the Wisconsin Center for Education Research, and Principal of EFGames, LLC and the Epistemic Analytics Group, to author a commentary about the articles in the special issue. Dr. Shaffer's scholarship has contributed immensely to methodological processes of studying identity and learning in dynamic and data rich worlds. We invited Daphna Oyserman to contribute a theoretical article based on her identity-based motivation research program. Dr. Oyserman is a Dean's Professor in the Department of Psychology and of Education and Communication at the University of Southern California. She is also a co-director of the USC Dornsife Mind and Society Center. Oyserman's research on Identity-Based Motivation has significantly contributed to scholarship about learners' identity trajectories.

It will become apparent as you read through the papers that scholars use a range of definitions to conceptualize identity. Whereas in some papers, identity exploration is foregrounded, identification, identity development and identity change, and identity-based motivation were prevalent in some other papers. The contexts in which identity is examined are diverse - digital games, MUVes, affinity space, and analog games. This is not surprising as games, irrespective of their medium serve as semiotic domains, with their own signs, symbols, contexts, and situated meaning. As the special issue editors, we welcome you to read these papers and think about how they might expand our understanding on learning and identity in VLEs from an ecological perspective. You may find the following questions useful as you reflect on the papers:

- ‘How’ are the processes of learning and identity exploration conceptualized?
- ‘What’ cognitive, pedagogical, and social processes are involved in learning and identity exploration in virtual environments?
- ‘Who’ are the learners, in terms of biological, social, cognitive, experiential, and affective characteristics?
- ‘Where’ in these environments is the learning and identity exploration taking place?
- ‘Which’ academic and professional domains facilitate learning and identity exploration?
- ‘When’ in the process do learners undergo meaningful transformations in knowledge structures and identities?
- How can learning and identity exploration of diverse students in a variety of virtual environments be assessed?

In his commentary Shaffer (2020) provides a summary discussion of the papers included in the special issue. We believe each of you will take away critical insights from the guest commentary and the invited theoretical article to help you reflect on your scholarship and engage in a discussion within the community (at your organization, regionally, nationally and internationally) on advancing research in the burgeoning field of learning and identity in VLEs.

Beginning with the invited theoretical article, Oyserman and Dawson (2020) discusses that the promise of VLEs can be witnessed in their designs, which can be tailored to meet students’ needs and to create situations in which students have choice. While this takeaway is applicable broadly, it might be particularly relevant in the context of designing VLEs that meaningfully represent and engage underrepresented minority groups (for e.g. Kim et al., 2018). Oyserman and Dawson (2020) continue explaining that the potential of VLEs is enhanced when they can be used in conjunction with educators, contexts, and activities that facilitate a transfer of activities from the virtual space. In doing so, students can be supported to examine what they did in the virtual environment and how they make meaning of those experiences as it relates to their goals and values for their desired or feared future selves. Once again, we believe this is an important takeaway and underscores the need for including research questions and processes that explicate the socio-cultural practices and locally-situated experiences in which VLEs are used to shape student identities (Foster, 2008; Gaydos & Squire, 2012; Silseth, 2012). In addition, this underscores an important dimension in that research and teaching with virtual learning environments should place an emphasis on augmenting the VLEs with socio-cultural practices that enhances students’ personal interest and valuing of the desired designed experience that may be used to support interest in particular areas.

Shaffer’s (2020) commentary indicates that it is imperative for researchers to develop and refine theoretical frameworks that can guide the operationalization of identity, and subsequently the interpretation of a learners’ identity exploration in a virtual world. This is important not only for advancing research on identity, but also as a way to make sense of big data generated from dynamic worlds like VLEs (Wise & Shaffer, 2015). Additionally, the need for methodological tools and processes that can align with theoretical conceptions of learning and identity in VLEs are

critical. As Shaffer (2020) explains, identity is interactional, performative, and subjective. This means we need novel and robust ways to examine and assess identity exploration and change over time for individuals and groups of students in the contexts in which we facilitate their learning. Shaffer (2020) briefly explained the Quantitative Ethnography (QE) methodology as one such approach; it offers a cadre of tools that show promise in this regard. QE techniques such as Social and Epistemic Network Signature (SENS) offers one way to analyze the potential vast amount of data from VLEs in assessing individual and group identity exploration and change (Gašević et al., 2019; Barany & Foster, 2020).

As indicated, as the research on learning and identity exploration in virtual learning environments continues to become more robust with theories and research, it is important that there is a socio-cultural inclusion that examines how individuals explore identities and go through identity change across different contexts. It is equally important that researchers leverage novel methodological approaches such as quantitative ethnography and techniques such as Social and Epistemic Network Signature. Together these approaches may provide a foundation for use-inspired research that guides how individuals continually and dynamically reinvent the self for a future that requires flexibility and adaptability in both career and academic spaces.

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