Examining Game Design Features for Identity Exploration and Change

Article · January 2016

CITATIONS
6

READS
522

2 authors:

Aroutis N Foster
Drexel University
61 PUBLICATIONS **674** CITATIONS
SEE PROFILE

Mamta Shah
Elsevier Inc
52 PUBLICATIONS **268** CITATIONS
SEE PROFILE

Jl. of Computers in Mathematics and Science Teaching (2016) **35**(4), 369-384

Examining Game Design Features for Identity Exploration and Change

AROUTIS FOSTER AND MAMTA SHAH
Drexel University, USA
aroutis@drexel.edu
mamta@drexel.edu

This study used the Dynamic Systems Model of Role Identity (DSMRI) to examine the extent to which a game, Land Science (LS), afforded identity change opportunities as exploration of science identities, science content knowledge, science confidence, action possibilities, and interest/valuing in an intentional manner. Analysis of the game and existing logged data for high school participants indicated that LS met its intended design goals of supporting students' knowledge gain for urban science and scientific modeling. Identity exploration was partially met as having content knowledge; however, the criteria for identity exploration and change as defined by the DSMRI model were not met. This may suggest why it was not clear whether participants valued the experience and the content as personally significant to their future goals. Implications are discussed for advancing knowledge in the field about educational gaming for changing students' science identities.

INTRODUCTION

In this paper, we argue that well-designed game-based curricula that promotes identity exploration and change among students in different academic domains can transform learners in terms of what they know, what they care about, what they want to be, what they expect to be, how they think and see themselves in relation to specific identities and academic material. We begin with establishing the relevance of identity change as an

educational goal and identity exploration as a precursor to identity change. Thereafter, we review literature on identity exploration and change in games, which reveal that this area of research is growing but needs a comprehensive approach. Lastly, we present the Dynamic Systems Model of Role Identity (DSMRI) framework. We discuss our operationalization of DSMRI as our theoretical lens to identify the extent to which games can afford opportunities for identity change. We apply the DSMRI model to examine an exemplary science learning game, Land Science. We present findings for how the game impacted students' identity exploration, knowledge and motivation to learn science using existing logged data.

IDENTITY CHANGE AND ITS RELEVANCE IN EDUCATION

Increasingly, a focus on facilitating students' ability to explore and form identities (e.g. exploring who they are or who they want to become) is gaining prevalence (Flum & Kaplan, 2006; Kaplan & Flum, 2012). The development of identity- "a coherent sense of one's roles and occupational pathway, one's self in relation to others, and one's values and purpose in life (LaGuardia, 2009, pp. 91)"- has been recognized as central to learning and life choices, with *identity exploration* as a crucial mechanism of identity formation (Erikson, 1968). Flum and Kaplan (2006, p.100) define identity exploration as the "deliberate internal or external action of seeking and processing information in relation to the self". Guiding students in trying out different identities and promoting their agency at the same may be a crucial educational goal to facilitate student engagement with academic material. Furthermore, curricula that are designed to enable students to try out different identities may be useful especially when the careers of the 21st century require trans-disciplinary skills (Kereluik, Mishra, Fahnoe & Terry, 2013) and students may not be prepared for or have mentors to observe for the same.

IDENTITY EXPLORATION AND CHANGE IN GAMES

Foster (2008) has argued that immersive virtual environments such as games can afford opportunities for shaping students' long-term interests in target domains and shape personal identity by making activities in the domain relevant and meaningful, and showing the applicability of the domain beyond school settings and for personal agendas. For instance, Miller and colleagues (2011) demonstrated in a brief intervention with *CSI: The Expe-*

rience how games could offer authentic professional play experiences which could not only aid students in acquiring content knowledge, but also allow learners to explore domain-related identities which may motivate them to pursue careers in particular disciplines that may not enjoy a positive social status among youth (e.g. STEM careers). However, research examining identity exploration and change as a part of learning in games is still in its infancy.

Primarily, researchers are investigating the impact of games on learners' identities through different lenses, but in a fragmented manner. For instance, in a recent review of literature, Ecenbarger (2014) concluded that few research studies have examined the interaction of video games as a space for identity exploration and construction, character and community identification in a cohesive manner. Furthermore, in terms of determining identity change, game-based learning research has explored (1) the process by which individuals progress within and across games learning - "the what of learning" and (2) how the learning is influenced by characteristics of the learner along biological, cognitive, experiential and affective lines – "the who of learning". For instance, San Chee and colleagues (2011) described the game based curriculum Statecraft X that connects the concepts of citizenship and governance and is designed to present learners with experiences for performing and developing the dispositions of citizens (e.g. agency, social cohesion) with a sense of shared national identity. However, few studies have explored (1) the ecological context of the learning –"the where of learning", and (2) how the frame of learning changes with time and space because the learner has changed however inconspicuously from time 1 to time 2 – "the when of learning" (Alexander et al., 2009). Furthermore, there has been less evidence about the effects of games on player's identity change, even though there are clear affordances for identity exploration. In particular, Shaffer (2006) introduced the Epistemic Frames theory that supports the design of epistemic games. Epistemic games are games that support pedagogical praxis and facilitate the acquisition of basic skills, knowledge, identity, values, and epistemology in a community of practice (Shaffer, 2004). For instance, epistemic games explore learners developing epistemic frames as ways of thinking, valuing, and knowing about professional praxis such as engineering (Chesler, Ruis, Collier, Swiecki, Arastoopour & Shaffer, 2013).

Lastly, the body of knowledge around identity exploration focuses largely on projective identities (the melding of real self and virtual self) which allows learners to explore only a single future possible identity and that too a temporary one (Gee, 2007; San Chee et al., 2011). Researchers

argue that our understanding of one's identity and the context is always subject to construction and reconstruction. Therefore, identity is always changing or being changed in context based on evolving situations such as playing a game. Thus, a player's projective identity is temporary and would change to possible selves as the learner engages in identity exploration over a significant period (Sinai, Kaplan, & Flum, 2012). Possible selves are the ideal selves that we would like to become (e.g. successful self) as well as the selves we are afraid of becoming (e.g. feared self) (Markus & Nurius, 1986). Thus, the development of possible selves can be influenced by (a) students' prior knowledge and perceived competences, (b) students' social networks, which can influence interest development as a given domain gains acceptance among peers (Oyserman & James, 2011), and (c) opportunities for students to identify with available domain examples to see themselves in a given role and develop knowledge in the domain (Foster, 2008). Finally, the process of facilitating long-term identity change should involve students in thinking reflectively from a starting self through possible selves to a new self at the end of a game experience. This experience has to be intentional and measured across the determined period of time (Foster, 2014).

Thus, there is a need for a unified approach to examining how games facilitate identity change. We propose the use of Dynamic Systems Model of Role Identity (DSMRI).

THEORETICAL FRAMEWORK

The Dynamic Systems Model of Role Identity (DSMRI), a framework that was developed to support learners in an intentional process of identity exploration and change (Kaplan et al., 2014) served as the theoretical lens for this study. DSMRI was developed to design curricular interventions in classrooms to facilitate a reflective process of identity exploration and change in specific academic domains. Since games and virtual environments can be compared to a curriculum (Foster, Mishra & Koehler, 2012), and since not much is known about the process of facilitating identity exploration and change in these environments, the DSMRI was co-opted in this study for examining the extent to which immersive virtual learning environments such as Land Science afforded opportunities for identity exploration and change in science learning.

DSMRI focuses on identity exploration using four constructs- ontological and epistemological beliefs, action possibilities, purpose goals, and self perception and definition of self (See Figure 1). We operationalized the four

constructs of DSMRI as content knowledge, game and technical literacy, interest and valuing, and regulated action respectively. We use the DSMRI as a model to explore the development of these four constructs in learners over a period of time that can help explain identity change as what learners know (science knowledge, game knowledge, and knowledge of strategies), how they think (personal and game goals, strategies used), how they see themselves and what they expect to become (sense of self and goals), what they care about what they want to become (motivation – personal valuing, interest, sense of self, and goals) in terms of a specific domain (Foster, 2014). Specifically, this change can be facilitated through repeated opportunities that promote a perceived sense of self-relevance, trigger exploration, facilitate a sense of safety, and scaffold exploratory actions (Kaplan et al., 2014). Thus, the following research question was examined,

> To what extent does the design of a virtual learning environment; namely, Land Science, facilitate identity change?

Figure 1. The Dynamic Systems Model of Role Identity (DSMRI) Operationalized for Game-Based Learning.

METHODS

This investigation is part of a larger 5-year NSF project that aims to support intentional identity exploration and change for students using im-

mersive learning environments to learn science (Foster, 2014). This paper reports initial findings from year 1 of the project. Year 1 involved investigating and characterizing the processes of identity change in known exemplary science games/virtual learning environments (EcoMUVE, Land Science, and River City) that aim to facilitate a science identity for users. We used intact complete existing data from these environments in our study. The process involved (1) conducting an analysis of the design of the environments for affording identity change and (2) examining existing data from complete studies of participants in the environments to learn science and explore science identities. A known limitation of using existing data is that we did not have the entire context for the environments – conditions under which players were playing, thus some information relating to identity change are missing. The existing raw data we analyzed was obtained through partnerships with the host institution for each environment. This paper reports findings for Land Science.

Description of Land Science

Land Science is developed on the theory of Epistemic Frames that introduces young people to basic skills, habits, and understanding related to urban science. (Bagley & Shaffer, 2009; 2015). The objective of Land Science is to help players understand concepts related to urban science, scientific modeling, and real-world problem solving. Players immerse themselves in a virtual apprenticeship experience that involves roleplaying as an urban planning intern for approximately 10 hours. Players work individually, with their peers, and mentors learning about the social (e.g. stakeholder needs assessment) and cognitive processes (e.g. using iPlan mapping tool) involved in urban planning. Ultimately, players propose a city re-zoning plan while also trying to balance the needs of the stakeholders. The design of Land Science is typical of games developed around pedagogical praxis or epistemic frames theory (e.g. Nephrotex) that focuses on thinking (cognitive), being (civic), and doing (practical) that is essential to all complex learning (Shaffer, 2004; 2006). Participants consisted of 16 high-school students (8 female and 8 male) in mid-western United States. They completed Land Science over three days in April 2014 in an out-of-school setting. Prior to the start of the study participants reported engaging in online activities such as watching videos, playing video games, and chatting on social networking platforms for about 4 hours a day.

Data Sources

Land Science. Data sources included Land Science for analysis of design features that aid identity exploration and change. Existing logged data in LS for 16 students was obtained from chat archives, notebook entries, intake-exit interviews, iPlan maps, and stakeholder assessment charts. The intake and exit interview included questions about participants' knowledge of what urban science is, the tools and skills that characterize urban scientists. The interviews provided participants with hypothetical situations requiring application of urban science knowledge. Furthermore, the intake interview asked questions about participants' technical literacy (computer use, online activities, gaming activities). The chat feature archived all conversation between the participants, their group members, and the group mentor as part of team meetings for all activities within the game. The notebook entries captured students' responses to the assigned tasks as part of their apprenticeship experience. The iPlan map and stakeholder assessment charts were visual tools participants used in the process of proposing a re-zoning plan. See Figures 2 and 3 depicting the interface of Land Science.

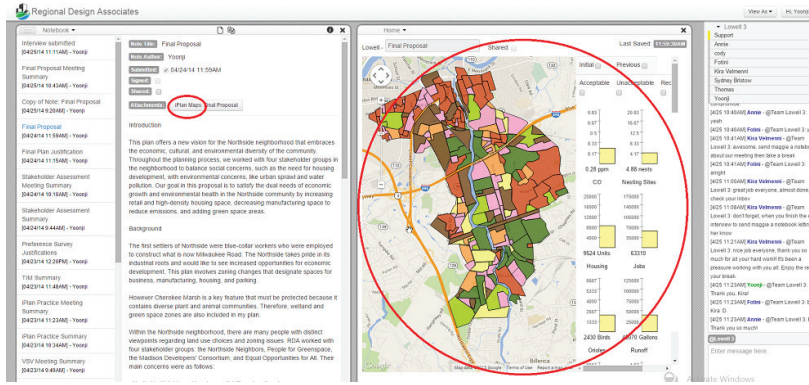

Figure 2. Left window: A player's notebook entry explaining decisions made for iPlan. Right window, A player's iPlan revisions.

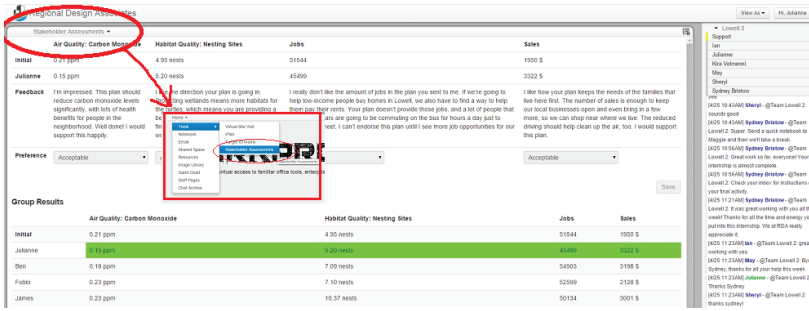

Figure 3. Stakeholder Assessment lets the player know how well they satisfied their stakeholder.

Data analysis

Overall, game design features and participant data were coded using combined deductive (i.e., theory-guided) and inductive (i.e., data-guided) analyses for examining characteristics of Land Science that impacted identity exploration and change in the content area (See Table 1). Deductive coding followed the theoretical definitions of the constructs of current selves, possible selves, projective identity, science knowledge, and motivation to learn science. Inductive analysis involved the use of discourse analysis (Gee, 2011), and quantitative content analysis (Riffe, Lacy, & Fico, 2014) for characterizing design principles. A computer algorithm was created that made it possible to streamline the large datasets of participant responses from the pre-post data and worksheets into a single table to simplify the discourse analysis process.

Existing data was examined for all the 16 participants in terms of the changes in what they know, how they think, how they see themselves, what they care about, and what they want to be and expect to be in terms of science related identities before and after playing the game. The changes were triangulated along the aforementioned parameters with the designed characteristics of the game. For instance, in order to understand the extent to which the game supported a participant's knowledge (what they know), existing data from all sources were examined chronologically and as they occurred in the game (in-take interview, notebook entries, iPlan maps, chat archives, and exit interview). The changes in participants' knowledge before and after the game intervention were examined in relation to changes in (a) procedural, declarative, and contextual knowledge, (b) game and technical

literacy, (c) interest in science, (d) valuing science, (e) regulated action. This was repeated for understanding how participants think, how participants see themselves, what participants care about, what they expect to become and what participants would like to be in terms of science related identities before and after playing the game. This allowed us to understand the extent to which the game afforded opportunities for identity exploration as defined by DSMRI. Statistical analysis was not possible due to the nature of data obtained from Land Science. Therefore, the in-depth analysis was performed for all the participants.

Table 1

Codebook for Examining Identity Exploration

Unit of Analysis/Comparable Dynamic Systems Model of Role Identity Concepts	Example of code
Content Knowledge/Ontological and Epistemological Beliefs	• Using terms of the Discourse (urban planning) in communicating (e.g. stakeholder needs, re-zoning)
Game and Technical Literacy/Ontological and Epistemological Beliefs	• Being able to read/understand multimodal information (e.g. visual, text)
Valuing/ Self-Perceptions and Self-Definitions	• See relationship between activity and current/future goals
Interest/Self-Perceptions and Self-Definitions	• Increasing interest influencing positive self-perceptions/self-concept of one's abilities in the domain (e.g. I am good at urban planning)
Regulated Action/ Action Possibilities	• Setting goals and taking actions based on socially accepted notions; i.e. opinions, comments, and behaviors or other people within the same social network
Identity Change	• Seeing science related careers as important, valuable and a possible self (personally important)

RESULTS

We report results for the extent to which the design of Land Science facilitated identity exploration and change. We first describe how the design of Land Science afforded opportunities for identity exploration and change

as defined by the DSMRI model. We then report changes in participants, learning for the whole group followed by a case that illustrates identity exploration and change based on the current game design. For the case, the change in what this participant knew, how she thought, what she cared about, how she saw herself, what the participant wanted to be, and what the participant expected to become in relation to urban science and scientific modeling before and after playing Land Science is described in detail.

Affordances of Land Science for identity exploration and change and whole group findings

Overall, LS is designed to provide players with a safe environment to explore the content and activities of what urban scientists do while rezoning a city (e.g. virtual site visit), why they need to strike a balance between different stakeholder interests, and how the tools used in the game help urban scientists develop and justify urban planning proposals (e.g. *iPlan mapping tool*). Engaging in these experiences provides opportunities for stimulating players' interest in urban science and provides opportunities for players to explore aspects of the domain. Nevertheless, LS provides fewer opportunities for promoting a sense of self-relevance and scaffolding identity exploration in the domain for the players. For instance, LS includes an intake and exit interview, which inquire into players' interest in Urban Science; however, within the game, the players are not prompted to reflect on their emerging interest in the domain. Also, players are not prompted to make connections between their experiences within LS and its relevance to what they would like to become in the future.

Participants started LS not knowing much about urban science. Nonetheless, participants completed the LS experience with increased knowledge and confidence in communicating using the discourse of urban science. Participants gained knowledge about scientific modeling, a complex process that allows urban scientists to assess how multiple factors within a system (e.g. a lake ecosystem) impact one another. Participants also demonstrated they could apply their acquired knowledge of scientific modeling to a problem situation posed in the exit interview. Interpretive analysis also revealed that participants became increasingly confident in using their emerging knowledge to support peers, thus reinforcing our finding that LS offered a safe environment for learners. Despite the changes in participants' knowledge of urban science, it was not clear if participants who completed the Land Science experienced changes in their personal interest in science, what they wanted to be in terms of science related careers in the future, and if

they valued the experience and the content as personally significant to their future goals.

Case

Changes in what the participant knew and thought. Ashley started the Land Science experience stating she was interested in learning about cities and the environment and that she usually got good grades in Science classes. When queried about her knowledge of urban science in the intake-interview, Ashley was only slightly confident about the information urban planners use. She responded, "Maybe examine the surrounding land, use blueprints if building something, talk with others...?" Even when she was presented with a hypothetical situation to ascertain her starting knowledge of scientific modeling, Ashley demonstrated a budding knowledge of the work involved in urban science:

> I would sketch the lake as present, gather information about the lake of/from past years (to form a timeline, such as of [chemical/element] levels), and hypothesize what would happen to the lake if the nearby farms stopped using the algae-causing fertilizer. To get the info, I would communicate with others -- possibly other scientists or observers -- or people with records, maybe the town hall or similar center has records, look at maps for lake characteristics and nearby farms...?"

Finally, in terms of her starting game and technical literacy, Ashley indicated that she frequently engaged in multiple online activities (e.g. chatting, watching videos, listening to music, blogging) and playing games on multiple platforms (e.g. social networking platforms, XBOX 360).

She was able to navigate through the technical aspects of the game and work according to the suggested workflow; that is, moving between performing assigned individual tasks-writing a notebook entry-participating in a team meeting-writing a notebook entry. Throughout the Land Science experience, Ashley's notebook entries and the final proposal represented a group voice. This suggested the extent to which working with her peers informed Ashley's knowledge gain. For instance, in her notebook entry summarizing the team meeting after the virtual site visit, Ashley described the following,

> We had another meeting! In our meeting, we talked about what the stakeholders' concerns were. Then, we compared our own opinions

> to theirs, and discussed representing opinions. We all agreed the stakeholders' main concern was the water quality.

After completing Land Science, Ashley demonstrated heightened knowledge and confidence in describing the information urban planners use and properties of a scientific model. She also demonstrated an increase in her ability to decipher multimodal information such as in a concept map.

___***Changes in what the participant cared about.*** Ashley started by understanding what the stakeholders she met with cared about. Her knowledge of the stakeholder interests was reflected in her decisions in the iPlan maps and her explanations during team meetings and notebook entries. She also cared about what her group members valued which impacted her decisions as an urban planning intern. For instance, Ashley provided the following explanations for her decisions when creating for the final re-zoning proposal,

> In my final zoning map, I tried to solve/satisfy both the views of my stakeholders and my group members' stakeholders. One conflict was that my stakeholders had ideas that required a lot of open-space to be placed, but some of my other group members' stakeholders didn't want too many birds and wanted more developmental things such as jobs and housing.

Nonetheless, she was also cognizant of her role as an urban planner and how her decisions would realistically impact the city and its residents.

After completing Land Science, Ashley reported an increase in interest in learning about cities and the environment, but she was not prompted about the extent to which Ashley personally cared for these topics or a career in urban science as a result of the Land Science experience.

___***Changes in how the participant saw herself.*** Ashley immersed herself in the role of an urban planning intern from the start. Throughout the game, she particularly identified herself as a member of the team who worked together through the activities, building understanding of urban science in the context of Land Science, and leading to the final re-zoning proposal plan. This was reflected in her communication through the chat and notebook entries. Contrastingly, she also made self-referential statements suggesting that she was able to make decisions independently. For instance, towards the later stages of the game, when it was time to submit her iPlan along with the justifications of her decisions, Ashley wrote the following in her notebook,

> I made a few changes to land codes, a big one being industrial zones converted to open land or commercial areas. I did this because many of the industrial zones were causing pollution in the air, were taking up larger parcels, and causing runoff….

As a learner, throughout the Land Science experience, Ashley felt that she was preforming at a slower pace than expected. With a supportive mentor and self-awareness, Ashley gradually picked up speed and completed all tasks on time. After proposing her final proposal, she expressed feeling satisfied with her performance but she was also cognizant of the gaps. For instance, in the final team meeting, she chatted with a peer stating, "I'm pretty satisfied with my map's numbers. I think the weak parts on my maps were possibly too little jobs and a lot of birds."

Ashley stated she enjoyed the Land Science experience. However, at no point in the game, during the intake and exit interviews was Ashley prompted to describe how she saw herself pursuing a career in science (urban science, environmental science and related field). Hence, it was difficult to ascertain how Ashley shifted in her perception of herself after her experience as an urban planning intern in Land Science.

____Changes in what the participant wanted to become and expected to become. We were unable to ascertain a shift in these aspects because data was not solicited before, during or after playing Land Science.

PROJECT SIGNIFICANCE

This investigation examined the extent to which the designed affordances of immersive virtual learning environments; namely, Land Science (LS) impacted high school students' identity change in Science. Land Science is an exemplary game built on a sound theory of Epistemic Frames (Shaffer, 2004; 2006). The game has been successfully implemented in after-school settings to promote middle and high school students' introductory understanding of urban science and scientific modeling (Bagley & Shaffer, 2009; 2015). Using the DSMRI model (Kaplan, et al., 2014), identity exploration and change was examined in participants in terms of what they knew, what they cared about, how they saw themselves, what they expected to be and what they wanted to be in relation to science related identities/careers before and as a result of the game they played. This study is exploratory and one of its kind given the emerging state of research examining identity change in games (Ecenbarger, 2014).

Preliminary findings from the analysis of Land Science and existing logged data from the study with high school students revealed that the current design of Land Science afforded gains in participants' content knowledge and game/technical literacy for urban science and scientific modeling. This was an intended outcome of the design of Land Science (Bagley & Shaffer, 2009; 2015). Participants also demonstrated heightened confidence as learners in general and invested in science, which can be attributed to designed features of LS for individual and social learning (peer and mentor support) throughout the experience. Through their responses, it became evident that the participants were able to identify with the identity role of an urban scientist intern. However, the participants were not prompted to reflect on the extent to which they cared about urban science personally as a result of the intervention. The participants also did not have opportunities to set and pursue personal goals, which could have provided insight about what they cared about, what they wanted to become or expected to become in relation to the field. Additionally, Land Science was effective at triggering interest in science in general and urban science. However, it was not clear the extent to which participants could see themselves as someone who would like to invest more time learning about careers in these fields. This could be attributed to the design of Land Science which limited number of identities (possible selves, Markus & Nurius, 1986) participants could explore in relation to urban science. Lastly, the duration of Land Science may have impacted findings for identity exploration and change among participants as suggested by researchers (Beier, Miller & Wang, 2012; Sinai, Kaplan & Flum, 2012).

The findings of this study can inform the design of games for supporting identity exploration and change in an intentional manner. Future examinations will focus on explicating a pedagogical process for facilitating identity change in games by considering the affordances and constraints of the games being used.

Acknowledgements

This material is based upon work supported by the National Science Foundation (DRL-1350707). The views expressed are those of the authors. We extend thanks to the Land Science team at the Epistemic Games Group of University of Wisconsin-Madison for granting access to their game and student data.

References

Alexander, P. A., Schallert, D. L., & Reynolds, R. E. (2009). What Is learning anyway? A Topographical Perspective Considered. *Educational Psychologist, 44*(3), 176-192.

Bagley, E., & Shaffer, D. W. (2009). When People Get in the Way: Promoting Civic Thinking Through Epistemic Gameplay. *International Journal of Gaming and Computer-Mediated Simulations (IJGCMS), 1*(1), 36-52

Bagley, E., & Shaffer, D.W. (2015). Learning in an urban and regional planning practicum: The view from educational ethnography. *Journal of Interactive Learning Research, 26*(4), 369-393.

Beier, M. E., Miller, L. M., & Wang, S. (2012). Science games and the development of scientific possible selves. *Cultural Studies of Science Education, 7*, 963-978.

Chesler, N. C., Ruis, A. R., Collier, W., Swiecki, Z., Arastoopour, G., & Shaffer, D. W. (2015). A novel paradigm for engineering education: Virtual internships with individualized mentoring and assessment of engineering thinking. *Journal of biomechanical engineering, 137*(2), 024701.

Ecenbarger, C. (2014). The impact of video games on identity construction. *Pennsylvania Communication Annual, 70.3*, 34-50.

Erikson, E. H. (1968). Identity: Youth and crisis. New York: Norton.

Flum, H., & Kaplan, A. (2006). Exploratory orientation as an educational goal. *Educational Psychologist*, *41*(2), 99-110

Foster, A. (2014). CAREER: Projective reflection: Learning as identity exploration within games for science. Drexel University: National Science Foundation.

Foster, A. N., Mishra, P., & Koehler, M. (2012). Digital game analysis: Using the Technological Pedagogical Content Knowledge framework to determine the affordances of a game for learning. In M. Khine (Ed.), *Learning to Play: Exploring the Future of Education with Video Games*. New York, NY: Peter Lang Publications.

Foster, A. (2008). Games and motivation to learn science: Personal identity, applicability, relevance and meaningfulness. *Journal of Interactive Learning Research, 19*(4), 597-614.

Gee, J. P. (2007). *Video games and embodiment*. Paper presented at the 2007 AERA Annual meeting, Chicago, Illinois.

Gee, J. P. (2011). *How to do discourse analysis: A toolkit*. New York: Routledge.

Kaplan, A., & Flum, H. (2012). Identity formation in educational settings: A critical focus for education in the 21st century. *Contemporary Educational Psychology, 37*(3), 171-175.

Kaplan, A., Sinai, M., & Flum, H. (2014). Design-based interventions for promoting students' identity exploration within the school curriculum. In S. A. Karabenick & T. C. Urdan (Eds.), *Motivational Interventions (Advances in Motivation and Achievement* (pp. 243-291): Emerald Group Publishing Limited.

Kereluik, K., Mishra, P., Fahnoe, C., & Terry, L. (2013). What knowledge is of most worth: Teacher knowledge for 21st century learning. *Journal of Digital Learning in Teacher Education, 29*(4), 127-140.

LaGuardia, J. G. (2009). Developing who I am: A self-determination theory approach to the establishment of healthy identities. *Educational Psychologist, 44*(2), 90-104.

Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist, 41*(9), 954-969.

Miller, L. M., Chang, C.-I., Wang, S., Beier, M. E., & Klisch, Y. (2011). Learning and motivational impacts of a multimedia science game. *Computers & Education*, 57(1), 1425-1433

Oyserman, D, & James, L. (2011). Possible identities. In K. L. V. L. V. S. J. Schwartz (Ed.), *Handbook of Identity Theory and Research* (Vol. 1). NY: Springer.

Riffe, D, Lacy, S, & Fico, F. (2014). *Analyzing media messages: Using quantitative content analysis in research*. London: Routledge.

San Chee, Y., Gwee, S., & Tan, E. M. (2011). Learning to become citizens by enacting governorship in the Statecraft curriculum: An Evaluation of Learning Outcomes. *International Journal of Gaming and Computer-Mediated Simulations (IJGCMS), 3*(2), 1-27

Shaffer, D. W. (2006). Epistemic frames for epistemic games. *Computers & Education, 46*(3), 223-234.

Shaffer, D. W. (2004). Pedagogical Praxis: The Professions as Models for Postindustrial Education. *Teachers College Record, 106*(7), 1401-1421.

Sinai, M., Kaplan, A., & Flum, H. (2012). Promoting identity exploration within the school curriculum: A design-based study in ajunior high literature lession in Israel. *Contemporary Educational Psychology, 37*, 195-205.