Increasing Productivity and Efficiency in Online Teaching

Patricia Dickenson
National University, USA

James J. Jaurez
National University, USA

A volume in the Advances in Educational Technologies and Instructional Design (AETID) Book Series

Information Science REFERENCE
An Imprint of IGI Global

Published in the United States of America by
Information Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA, USA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: http://www.igi-global.com

Library of Congress Cataloging-in-Publication Data

Names: Dickenson, Patricia, 1975- editor. | Jaurez, James J., 1970- editor.
Title: Increasing productivity and efficiency in online teaching / Patricia Dickenson and James J. Jaurez, editors.
Description: Hershey, PA : Information Science Reference, 2016. | Includes bibliographical references and index.
Identifiers: LCCN 2016006149| ISBN 9781522503477 (hardcover) | ISBN 9781522503484 (ebook)
Subjects: LCSH: Web-based instruction. | Computer-assisted instruction | Internet in higher education. | Teaching--Computer network resources.
Classification: LCC LB1044.87 .I338 2016 | DDC 371.33/44678--dc23 LC record available at https://lccn.loc.gov/2016006149

This book is published in the IGI Global book series Advances in Educational Technologies and Instructional Design (AETID) (ISSN: 2326-8905; eISSN: 2326-8913)

British Cataloguing in Publication Data
A Cataloguing in Publication record for this book is available from the British Library.

Chapter 14
Authentic Online Branching Simulations:
Promoting Discourse around Problems of Practice

Eric Bernstein
University of Connecticut, USA

Sarah A. McMenamin
University of Southern California, USA

Michael C. Johanek
University of Pennsylvania, USA

ABSTRACT

This chapter describes the use of online branching simulations, with varying levels of production value and using a variety of different development tools, to create authentic experiences for students in online courses. Simulations are a method of increasing student engagement, providing authentic learning experiences that enhance critical thinking skills and foster meaningful collaborative interactions among students. By creating simulations that are online, they are scalable and especially effective for use in distance and online learning environments. The use of these simulations draws on research supporting the effectiveness of simulations in education and in other professional fields, leveraging Social Learning and Social Cognitive Theories and builds off of a Computer-Supported Collaborative Learning (CSCL) framework.

INTRODUCTION

This chapter describes the development and use of online simulations, with varying levels of production value and using a variety of different development tools, to create authentic experiences for students in education courses. The use of these simulations draws on research supporting the effectiveness of simulations in education (to a limited extent) and in other fields (to a larger extent), leverages Social

DOI: 10.4018/978-1-5225-0347-7.ch014

Learning and Social Cognitive Theories, and also builds off of Stahl, Koschmann, and Suthers' (2006) Computer-Supported Collaborative Learning (CSCL) framework.

The types of simulations discussed offer opportunities for participants to explore problems that they will "predictably...encounter in the world of practice" and thus "serve as the stimulus for acquiring new knowledge" as participants examine and define the problems and "wrestle with how to apply [their]... knowledge to resolving the problem they face" (Bridges & Hallinger, 1997, pp. 132-133). Gokhale (1996) suggested that integration of simulations into traditional teaching structures is a promising pedagogical approach to building students' ability to "transfer and apply the knowledge to real-world problems" (p. 6). Because of the multi-faceted nature of educator praxis, there is a need for experiential approaches to preparing educators and school leaders that both build on research-based practices as well as the real-life experience and expertise of experienced practitioners in the field.

The authors' specific approach to simulation does not intend for the online simulation to be a stand-alone instructional tool. Rather, the simulation provides the shared experience that will form the basis for critical conversations with peers around practice and decision-making. Indeed, with simulations in other fields, like healthcare, the debriefing of the simulation experience is essential to the effectiveness of the simulation in promoting learning outcomes (Fanning & Gaba, 2007). Vygotsky's Social Learning Theory (e.g., Wertsch, 1985) and Bandura's Social Cognitive Theory (Bandura, 1989; Bandura, Ross, & Ross, 1961) heavily influenced the development of a Computer-Supported Collaborative Learning (CSCL) framework proposed by Stahl, Koschmann, and Suthers (2006) and based specifically on collaboration theory (Stahl, 2004). The CSCL framework suggests the use of "microanalyses of collaborative learning with and through technology in order to identify the features of designed artifacts that seem to be correlated with effective learning" (Stahl et al., 2006, p. 14).

The chapter will also describe previous and proposed uses of simulations, also referred to as "sims," in educational courses and professional learning environments and the ways that simulations have supported the depth of the learning experiences of students. The chapter will also offer an overview of ways to design simulations—including a discussion on the use of simulation authoring, itself, as a pedagogical tool within a course—and guidelines for facilitating discussions around simulations in various online formats. The formats discussed will include asynchronous, LMS-based tools as well as synchronous discussion options on video-based platforms and internet discussion applications like Twitter.

BACKGROUND

Online simulations have been used successfully in higher education, since 2003, though they were used even earlier, in the 1990's, for military and medical training (Beckem & Watkins, 2012). Those earlier sims were primarily focused on business, engineering, and students in the medical fields. Only in the last several years have applications of simulations in educator preparation been considered. According to Beckem and Watkins (2012), "the common element in each of these [applications] is the focus on the learner and concern for the learner's experience to be meaningful, engaging, and transferable to the real world" (p. 62).

Beckem and Watkins (2012) identified several ways that online simulations are effective tools to enhance learning. They described simulations as: Personalized—that online simulations offer a "student-centered approach to learning;" Multi-Modal—that online simulations allow students to use a variety of modes to learn while doing, which they assert is "the most effective way to transfer short-term knowledge into long-term memory;" Plug-n-Play—that online simulations are easy to use; On-Demand—that online simulations can be available at any time for students to engage in, which is especially salient in online academic programs where students are broadly distributed geographically; and Failing Forward—the "sandbox" notion that students can make mistakes in a safe, low-risk environment and learn from their failures (p. 64).

ENGAGING STUDENTS IN AUTHENTIC LEARNING ONLINE: ISSUES, CONTROVERSIES, AND PROBLEMS

When preparing professionals to enter the field, and in particular when preparing people for leadership, the complexity and nuances that ready students for practice are lacking. Students in many fields, from business, to medicine, to education benefit from the opportunity to connect what they have learned in the classroom (the intellectual) to the real-world (the practical). However, there are few mechanisms for providing authentic opportunities to learn about and practice those skills that are necessary when professionally interacting with others. In addition, the students themselves come from increasingly diverse backgrounds and may approach problems of practice from widely different perspectives. The complex contexts within which school leadership practice takes place, coupled with the diversity among the students in school leadership preparation programs, have resulted in demands for programs to extend opportunities for practical applications of the intellectual content (Robey & Bauer, 2013; Valle, Almager, Molina, & Claudet, 2015; Peterson & Finn, 1985).

How do you create a classroom activity that encompasses the subtlety of professional decision making and allows students to practice and explore those dispositions in an authentic way? This type of learning has been addressed in some fields, for example medicine through human patient simulations, that provide standardized learning opportunities for students. Researchers at Syracuse University adapted the process to the education environment, creating human parent simulations that provide similar real-world experiences (Dotger, Harris, & Hansel, 2008).

Engaging Students in Active Learning Experiences in the Online Classroom

Although online education provides both opportunity and flexibility for students, the virtual classroom environment, which in some cases includes asynchronous learning, can prohibit the fostering of the small learning community that typically develops in a brick and mortar classroom. In order for students to become fully engaged in an online simulation, they must immerse themselves in the world of the scenario by suspending disbelief (Herrington, Oliver, Reeves, 2003). They must allow themselves to become part of the scenario, in essence, an actor.

How does one provide an education experience that is both individualized and shared to foster engagement and active learning? Saba (2012) uses systems theorists as a springboard to discuss how in addition to the social aspects of a classroom, there is also a psychological component that is impacted by the perceived amount of instructor versus student control. He calls this a transactional distance and offers that if class discussion and student agency is encouraged, that perceived distance decreases. There must be an emphasis placed upon interaction and discussion (Arbaugh, 2000, Saba 2012).

Regardless of volume of discussion, student engagement can be thwarted or diminished by a one-size-fits all educational philosophy that does not account for students' learning styles and their individual approaches to problem solving (Darling-Hammond, 2000). Darling-Hammond (2000) describes low inference educational tools as being insufficient to reach all types of learners and to address their needs for real-world problem solving. In order to be effective, learning tools should offer students the opportunity to address a variety of problems that involve interaction with different personality types and to solve them in their own ways, (Darling-Hammond, 2000).

The conscious effort of differentiating and analyzing the factors represented in different settings for practice is what distinguishes preparation for professional practice from an apprenticeship model in which novices aim to copy the skills of a veteran practitioner, as though they will be applicable in all contexts. (Darling-Hammond, 2000, p. 528)

In order to engage students and decrease the transactional distance between instructor and student, online simulations must provide authentic learning experiences.

Authenticity of Classroom-Based Professional Learning

But how does one provide authentic learning experiences? Is it possible to successfully transfer real-world experiences into a computer-based environment? The most direct way is to provide experiences that are based upon actual problems of practice that are presented in context (Dotger, et.al, 2008; Darling-Hammond, 2000; Herrington, Oliver, & Reeves, 2003). Students recognize and respond to that authenticity by suspending disbelief and submerging themselves in the presented exercise.

Individual experiences differ, both in the way that information is conveyed and how it is perceived, so how can coursework account for the variability that occurs when a professional is out of the classroom and in practice? Since each student might experience the exercise differently, the ability to explore different solutions and the outcomes to which they lead is important to that authenticity. Exercises should anticipate a diversity of paths to success (Darling-Hammond, 2000; Herrington, Oliver, & Reeves, 2003). In addition, Dotger et. at. (2008) suggest that areas of focus for the exercises should be either prevalent, socially important, clinically important, or instructionally important in order to support authenticity related to future practice.

Herrington, Oliver, and Reeves (2003) identified ten characteristics of authentic learning. Authentic activities:

- Comprise complex tasks to be investigated by students over a sustained period of time.
- Provide the opportunity for students to examine the task from different perspectives, using a variety of resources.
- Provide the opportunity to collaborate.
- Provide the opportunity to reflect.
- Can be integrated and applied across different subject areas and lead beyond domain specific outcomes.
- Are seamlessly integrated with assessment.
- Create polished products valuable in their own right rather than as preparation for something else.
- Allow competing solutions and diversity of outcome (pp. 62-63).

Course developers and instructors who wish to provide authentic learning experiences have historically utilized several common techniques, such as case studies, role plays, and actors who portray standardized characters and roles (originally called human standardized patients). Medical schools have been using standardized human patients as an integral part of training since 1963 in order to provide an authentic learning experience for students (Wallace, 1997). They are actors who are trained to report a variety of symptoms during an exam exercise. The goal of the standardized human patient is to provide every student with the same, standardized experience while interacting with a “patient” (Dotger et. al., 2008).

The process eliminates the one dimensionality of a case study and creates a consistency that is not possible with students performing in role plays. Since its introduction, standardized human patient exercises have found their way into other disciplines. In particular, one educator preparation program has adapted the exercises to develop the standardized parent at Syracuse University (Dotger et al., 2008). In that program, actors are trained to take on the roles of parents and other stakeholders that teachers and school leaders may interact with in certain scenarios. Students are then placed into those scenarios with the trained actors. Similar to the limitations of standardized patient programs, standardized parents are a “limited resource” and may be “difficult and costly to recruit” SPs for” (Kotranza, et al., 2009, p. 370). Given those constraints, how can programs maintain the authenticity of the standardized human experience on the scale represented by online learning?

Scalability of Authentic Learning Experiences

The challenge in creating an authentic learning experience in an online environment is the geographic distribution of students and more importantly, the scalability required to hire and train for an exercise that employs real-life situations in the same manner as the standardized patient model. Students engaged in online learning are geographically separated around the country and, potentially, around the world. According to Allen and Seaman (2013) thirty-two percent or 6.7 million Americans report taking at least one online course. However while almost seventy percent of higher education institutions provide online learning opportunities, only one third of small institutions and 45% of large institutions rate themselves as above average or somewhat above average in their ability to scale their offerings to students (Allen and Seaman 2013).

In the case of Syracuse University, twelve local actors were hired and underwent two hour trainings prior to beginning the standardized parent simulations (Dotger et. al. 2008). If an online program were to try and create authentic learning opportunities by implementing standardized human exercises the process would have to be recreated within a reasonable radius of travel for every enrollee. The costs involved with recruiting actors, training them, and coordinating student schedules in multiple, changing locations would be cost-prohibitive.

So how can an online program efficiently recreate the authentic learning experiences for a geographically separated population for financial feasibility and scale? How does one capture the lived experiences of current practitioners, both for the purpose of enhancing those current practitioners own dispositions of practice and to capture those authentic learning opportunities for pre-service candidates? Although in-person standardized simulations are not efficient due to scalability issues, those characteristics which make them successful can be recreated in online learning through branching simulations. Branching simulations are linear progressions that adjust based on decisions made by the student. Simply put, the student is given a series of choices for what action to take and the simulation branches off based on the choice made. This then leads to another choice and the branching continues until an endpoint of the simulation is reached.

Creating Low-Risk Opportunities for Experiential Learning

It is important that students feel comfortable taking chances and exploring multiple responses to a problem while still in preparation to enter professional practice. This provides opportunities for students to take chances, explore alternatives, and to fail as well as to succeed. What kind of opportunities can online learning offer to provide students with the opportunity to try and sometimes try again as they experience a real world problem? According to Green et. al (2014) one of the benefits of moving a traditional classroom curriculum online is that:

Students may feel less peer pressure or fear of repercussions than they might feel in a traditional classroom, and this may increase their willingness to be honest and allow for greater introspection and intrapersonal learning. (p. 24)

By design, an online branching simulation creates opportunities for users to take risks and explore the possible outcomes of decisions they might make in the future. Online simulations can be particularly successful because they include both an individual challenge (e.g. to respond to the problem presented) and a shared experience that can be discussed afterwards by all of the participants. In the virtual context, these discussions could take place through a variety of synchronous or asynchronous tools, including discussion boards, chat rooms, face-to-face meeting software, or even on Twitter.

While it is possible to undertake a simulation in isolation, the greatest value for the students lies in the debriefing and comparison process (Henneman, Cunningham, Roche, and Curnin 2007). This occurs when students begin to understand that there are multiple ways to perceive, process, and address problems of practice. Because there is not necessarily one "right" way to resolve the dilemma, this is a low risk opportunity for students to share their perspective and resulting actions. In discussion students can consider alternatives to their decisions that might not previously have been evident to them. By demonstrating a willingness to learn from the comparison of personal experiences with those of peers, students demonstrate the ability to reflect and to learn from within practice (Darling-Hammond, 2000).

Online branching simulations can support transformative learning in students, which occurs when a student's frame of reference is changed by an experience (Mezirow, 1997). The experience of low-risk debriefing becomes the catalyst for transformative learning. Darling-Hammond (2000) discusses how when a case is discussed and reviewed in a group, it becomes a second-order experience because it allows the student to reconstruct the experience with language and to share it. She asserts that the experience can be converted to a third order experience by sharing the results with the wider community, and the result can sometimes then be generalizable.

SOLUTIONS AND RECOMMENDATIONS

The use of online branching simulations is a manner of responding to the needs identified in this chapter. These tools, whether homegrown or commercially produced, can be an efficient way to enhance the quality of teaching and learning in the online classroom. In particular, online branching simulations offer new ways to accelerate the development of adult learners—particularly those in pre- and in-service professional learning programs—tapping emergent technology to rapidly and richly transfer experiential learning from classroom to practice.

Less experienced students and aspiring professionals can accelerate their development through an integrated use of simulations created by experienced peers, while those experienced peers learn more deeply through the process of authoring simulations. Integration of online branching simulations directly addresses the shortcomings of the all-too-common decontextualized learning that occurs in classrooms today. The use of practice-based, consequential experiences around daily challenges in the respective field offers opportunities for trial, feedback, discourse, and improvement in the decision-making at the core of the ultimate work for which the classroom is preparing the students.

Branching Simulations as Interactive Tools to Support High Quality Learning

For nearly two decades, there has been a movement to consider why student engagement matters in higher education. Student engagement with "academically purposeful activities" has been identified as essential to both the personal growth and development of students and the learning outcomes from those activities (Delialioğlu, 2012, p. 310; Kuh, 2001). Simulations are a form of immersive learning that place the learner in the active context of a scenario, where they are required to make decisions based on stimuli they face in the simulated context. With respect to enhancing student engagement, "adult learners… have reported great enthusiasm when learning in immersive spaces" (Dawley & Dede, 2014, p. 727).

Enthusiasm is an important element of student engagement. However, enthusiasm alone is not enough to enhance learning outcomes. Simulations are, at their essence, experiential learning opportunities (e.g., Dunleavy, Dede, & Mitchell, 2009). The completion of a simulation, and the decision-making skills exercised throughout that process, coupled with the discourse facilitated in the follow-up debrief of the simulation effectively support the development of critical thinking skills among participants. Both experiential learning opportunities and a focus on critical thinking skills have been shown to positively impact student engagement in higher education contexts in ways that enhance learning (e.g., Sampson, 2015).

Case studies and role plays have been one answer to the call for fostering critical thinking skills in the engaged higher education classroom (Hooper, 2014). While case studies and role plays are effective at generating enthusiasm and developing critical thinking, they are not considered richly experiential. However detailed the case study is, it remains flat and unadaptable to the participants' actions. Role plays, on the other hand, are active, but they are not consistent and rely significantly on the skills of the players to act out the roles. The level of experiential quality of role plays tends to be highly variable. Simulations, on the other hand, address both of these drawbacks evident in role play and case study teaching methods.

Simulations Are Reactive to the Actions and Choices of the Learner

The feedback the participant receives after they make a decision varies based on what decision they make. Whether live simulations, such as the "standardized patients" (Hooper, 2014) in medical education or the "simulated parents" (Walker & Dotger, 2012) in teacher education, or computer-based simulations, student decisions in the instant impact the response they receive from the simulation. With a case study, even when there is subsequent information provided in stages, that information is virtually always static and non-responsive to the initial choices made or approaches taken by the participant.

Simulations Are Planned and Standardized, Providing Consistent Experiences

Unlike case studies, role plays do offer reactions and responses that are based on the decisions or approaches of the participants. A strength of engaging students in role plays is that the students embody multiple sides of the story and play different roles. However, the fact that students are assuming the roles in role plays means that the quality and nature of the responses is highly variable and dependent on the preparation and skills of the opposing participants.

The live simulations that are comparable to the computer-based simulations this chapter focuses on utilize highly trained actors in the roles faced by the student participants. That professionalization and standardization increases the consistency of the experience from participant to participant (Alerte, Brown, Hoag, Wu, & Sapieha-Yanchak, 2015). In computer-based simulation, the standardization is absolute, with complete control over the responses different students get to the same decisions or actions.

Essential Elements of Effective Simulation for Learning

In historical application of simulation, the heart of the learning came from the actual simulated experience. For example, flight simulation has been a method used to actually teach pilots the way to operate the plane they will fly. Before ever taking a training flight in an actual helicopter, United States Marines training to fly the President of the United States spend extensive time "learning" to operate, fly, hover, and land in Marine One simulators (L'Heureux & Kelley, 2014). Even as simulation has moved into corporate training contexts, it is commonly used for compliance training to teach right and wrong procedural decisions (e.g., Barnett & Mattox, 2010).

Our specific approach to simulation does not intend for the simulation to be a standalone instructional tool. Rather, the simulation is the shared experience to form the basis for critical conversations with peers around practice and decision-making. The debriefing of the simulation experience is essential to the effectiveness of the simulation in promoting learning outcomes (Fanning & Gaba, 2007).

Authoring Online Simulations

The online simulations we have developed have utilized several technology-based authoring and production tools, the basic process of simulation authoring is platform-neutral. Furthermore, the production of the simulation can be done through a variety of commercial and free tools, ranging from courseware and instructional design software to question logic in freely available online survey creators or presentation-embedded hyperlinks in PowerPoint.

There are many ways simulations may be written. The authoring process we have utilized in our projects can be summarized in several steps (these steps could be adapted or modified to the individual context):

Step 1: The scenario is written as an overview narrative. In the narrative, the context and the roles should be identified. In particular, noting what role the student/player will be assuming in the first-person form.

Step 2: Authors identify local, state, or national standards, or other benchmarks, as the learning objectives that this simulation will be designed to address.

Step 3: The prompt for the first stage of the simulation is drafted. This includes narrative necessary for the player to immerse in the scene, notes about the setting of the scene, and then the decision/choices that will need to be made by the player in response to the prompt for that scene. The decision may be in the form of an action (e.g., who to return a phone call to first or when to set a meeting for, etc.) or, if the scene involves an interpersonal interaction (e.g., meeting with a subordinate), the actual choices of what the student/player would say to the other person. Generally, there should be between two and four choices for responses to the prompt.

Step 4: Reaction/consequence scenes are then composed for each choice posed by the decision prompt. The author describes what happens after each particular decision is made. There is generally a one-to-one ratio between choices and reaction scenes. However, it is possible that more than one choice may result in the same reaction, in which case, there may be fewer reaction scenes than choices in the previous stage.

Step 5: Each reaction/consequence scene leads to either a simulation endpoint or a subsequent prompt stage. There are no fixed numbers of decision-making layers that must be included in a simulation. A simulation may end after only two decision points (what we would call a micro-sim), after several decision-points (a mini-sim), or could have a virtually unlimited number of decision points (a full-scale sim). If there is not an endpoint reached, a new prompt stage is written based on the preceding reaction/consequence. Revisiting Step 3 and repeating the process until all choices for each decision point on each stage has leads to a reaction/consequence and, ultimately, down a path to an end point.

Step 6: This step may take place at various points throughout the authoring process. The prompts and decision points are shared with peers for review. In the review, the peers should consider whether the scenario posed seem authentic and whether the choices offered cover sufficient breadth to allow for immersion. In addition, do the reactions/consequences feel realistic and have sufficient detail to allow for discussion.

Method of Study

We conducted an initial study deploying an online multimedia branching simulation to a group of pre- and in-service school leaders. The model employed in that initial study included facilitation of the professional dialogue informed by the simulation participation. This differs from the historical use of simulations as individual, standalone learning experiences (De Jong & Van Joolingen, 1998). Following the simulation and debrief exercise a written survey was administered to gather feedback on the learning experience. Analysis of the results revealed strong support for that model.

Across all groups of respondents (principals, assistant principals, and aspirants), an overwhelming majority of reactions were positive. Greater than a three to one ratio of participants indicated that the leadership simulation prototypes used during the course enhanced their leadership skills and 18 of 22 felt that leadership simulations, broadly, provide useful opportunities for professional development (with only one respondent expressing apprehension to the use of simulations in leadership professional development).

One principal respondent, consistent with the research on PBL (e.g., Gijbels, Dochy, Van den Bossche, & Segers, 2005), said that the use of the simulation "definitely enhances problem solving skills." An assistant principal respondent explained the value of the sandbox (a safe space without real-world risks) that simulations afford participants to experience, saying that the opportunity to see "some of the less professional [decisions] play out [can] be really helpful with what not to do/say." Finally, one of the aspirant respondents appreciated the "realistic feedback to a real situation," going on to say that the "simulation offers a quality opportunity to practice" what we have learned about school leadership (Bernstein & Sciarappa, 2015, p. 5).

The social learning model that was employed in the class, involving discussions and facilitated debriefing of the decisions made in the simulation, was also strongly supported by the participants. The facilitator's self-reflection noted that participants became exceptionally engaged in the discussions and became animated as they reacted to the decisions and consequences embedded within the micro-sims. Moreover, the facilitator described the depth of discourse around various decisions encountered in the simulation, specifically identifying repeated comments by participants throughout the session about the value of the opportunity to discuss varying rationales for particular decisions.

The facilitator's descriptions and reflection were supported by participant responses to survey items, repeatedly citing the value of collaboration and discourse as key strengths in the simulation-embedded professional development. Several responses mirrored that of one principal, who said "situations that can be viewed, discussed, and provide opportunity for reflection...enhance my leadership skills." An assistant principal explained that "the most useful part of this experience is the conversation with colleagues" (Bernstein & Sciarappa, 2015, p. 6).

The Social Learning Model of Online Simulation Integration

The Penn Educational Leadership Simulation Program (PELS) at the University of Pennsylvania Graduate School of Education has developed and implemented a social learning model around simulations that is rooted in Stahl, Koschmann, and Suthers' (2006) Computer-Supported Collaborative Learning (CSCL) framework and Stahl's (2004) collaboration theory. The facilitation of simulations developed by PELS have been managed in multiple ways and each method may be employed effectively in online learning environments.

PELS simulations may be completed as a large group, synchronously; in small groups, synchronously; or individually, asynchronously (Bernstein & Johanek, 2014). The most significant value added by the use of simulations, particularly across distance in online classes, is aligned with the primary purpose of CSCL. Simulations "create conditions in which effective group interactions are expected to occur" (Dillenbourg, Järvelä, & Fischer, 2009, p. 4). Though there are some slight variations in the social learning model strategies employed, the learning in each of the three delivery methods relies heavily on the way students interact during and/or after the simulations are completed.

The logistics of using simulations in synchronous online environments are similar, regardless of whether the delivery is whole group or small group. In either case, an online collaboration space that is capable of either screen-sharing (a commonly available feature) or resource-sharing (less commonly available and dependent on the nature of the online branching simulation development tool) is necessary. The web-based simulation is then loaded through the screen-share or resource-share mechanism of the collaboration space. The only logistical difference between whole group and small group is that in whole group delivery, the entire class remains in the same collaboration space, whereas for small group, there are several instances of the collaboration space and simulation going on. It is possible for small groups to work synchronously within the group, but that each small group completes the simulation at their convenience prior to the class debrief.

Whole Group Synchronous Facilitation of Simulations

In whole group delivery, at each decision point of the simulation, the skilled facilitator makes one of four choices: 1) straight poll, without class discussion; 2) class-wide discussion about choices prior to the poll; 3) peer discussions, followed by poll; or 4) peer discussions, followed by class-wide discussions prior to poll. Once a consensus is reached, the decision of the entire class is made and the simulation reacts. Once the class sees the reaction, the next prompt or decision arises. At that time, the facilitator may ask questions about the previous decision (e.g., would you change the decision you made, given the reaction?) or moves on and repeats the facilitation process for the next decision point. Side-channel communication tools may be used to moderate the entire discussion (in lieu of two-way voice discussion, for example) or as a way to enhance the primary discussion (Hyde & Ferrario, 2015).

Small Group Synchronous Facilitation of Simulations

In small group delivery, groups of approximately four to six students each engage with the simulation in a collaborative online work space. As they go through the simulation, they should be directed to discuss each decision point, consider opposing views, and reach consensus on which choice to make. Small groups should keep notes of the salient points raised in the discussion around each decision point. In particular, discussions around questions where consensus was less easily reached should be carefully documented. Upon completion of the simulation, it is essential for a facilitated whole-group debrief discussion to be convened. This can be done through the synchronous online collaboration space or asynchronously through threaded discussions about various parts of the simulation experience.

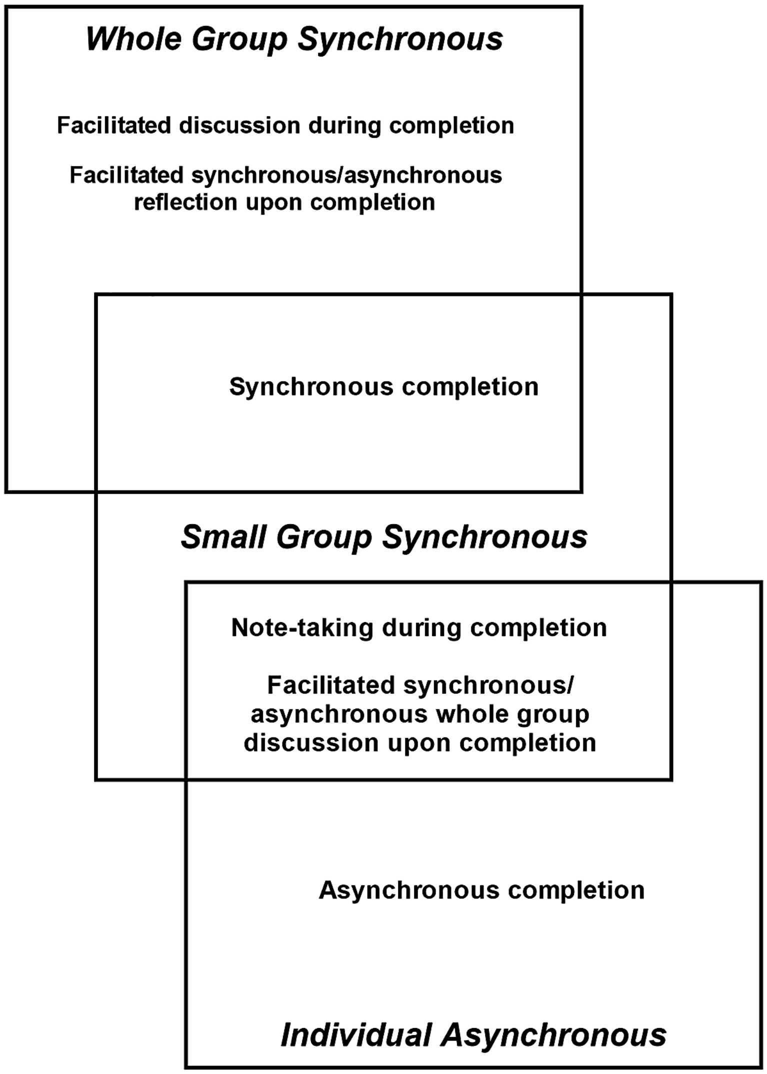
Individual Asynchronous Facilitation of Simulations

The nature of CSCL and the PELS social learning model support empirical findings that collaboration, especially in distance-based contexts, "show a significant advantage...over individual learning" (Dillenbourg, Järvelä, & Fischer, 2009, p. 4). That might lead to the conclusion that individual asynchronous simulation engagement is the least desirable online method of simulation facilitation. While this is arguably the case, the disadvantages of individually completing the simulation can be largely mitigated by skilled facilitation of a synchronous or an asynchronous dialogue around the decisions made in the simulation process (Bernstein & Johanek, 2014). Similar to the small group facilitation, the individuals should be directed to take notes about their thinking when making decisions. They should consider and document, for example, which decisions were "closer calls" than others, whether they would have made different decisions than the choices presented, or whether the reaction to a particular decision may have led them to reconsider the prudence of the choice they made. Once they have completed the simulation, a whole group discussion (similar to the whole group debrief following the small group synchronous simulation completion) must be facilitated around those notes about the experience and the decisions made (figure 1).

Practitioner Authors: Capturing Authentic Experiences from the Field

A common method of simulation development is known as the subject-matter expert (SME) method. In that method, an instructional designer or simulation author collaborates with a SME to gather the information necessary to author the simulation (Spector & Muraida, 2013). This simulation authoring

Figure 1. Graphical depiction of the intersections of the three methods of simulation facilitation



process is most common and does result in simulations that are useful. However, there are subtleties that, despite close collaborations between an author/instructional designer and a SME, are often misrepresented or presented in ways that are less authentic. Authenticity fosters the suspension of disbelief by the participants Such misrepresentations or threats to authenticity can have the almost immediate effect of removing the student from the immersion of the simulation and reducing the simulation's credibility as an accurate representation of a potential reality (Kantor, Waddington, & Osgood, 2000; Dieker, et al., 2014; Herrington, Reeves, Oliver, & Woo, 2004).

The easiest examples to illustrate the subtle issues that arise in that traditional authoring model can be seen in television shows. Take, for instance, the classic paramedic television show "Emergency!" It was not uncommon for Johnny Gage or Roy DeSoto to radio in to Rampart General Hospital and report vitals for a patient. Whenever they reported a blood pressure such as "120 over 80 by palp," any real emergency medical provider knew that the show hadn't done all of its homework. When you take a blood pressure by palp, you only get a systolic (top number) reading. This would go unnoticed by the casual observer, but not by a person in the field. These are the types of nuances that slip through collaborations between SME's and instructional designers and, when related to immersive learning, these are the types of errors that break the immersion instantly.

One of the key characteristics of the PELS work is that the simulations are written by experienced practitioners from the field. There is no translation through an instructional designer/simulation author. Rather, the practitioner *is* the simulation author. This process results in a validation that enhances the immersive quality of the resulting simulation. Terms and "lingo" are used properly and with appropriate regularity, fine details look and sound real because they are drawn from the real experiences of the practitioner. This practitioner-author model results in something the PELS team has referred to as "experiential validity" (Bernstein & Johanek, 2014). That is, a validity of the scenarios attributable to the experiences of the practitioner-authors. In all of the pilot research and facilitation of PELS simulations, the common response is that the scenarios feel "so real." That response is a result of experiential validity (Bernstein & Sciarappa, 2015).

Simulation Authoring For Learning: Developing Systems Thinking Skills

In the initial phases of development of simulations through PELS, there was an unintended finding among the simulation practitioner-authors. The practitioner-authors wrote simulations based on a real problem them encountered in their practice. It turned out that after authoring simulations, the practitioners would return to their work environments and report that they would confront and think about new problems of practice as if the problem were a simulation they were writing.

When writing a branching simulation based on a real problem experienced by the practitioner-author, the author does not only consider the path they took in the real event. At each phase, they must consider alternative choices they might have made. This is an exponential process, because at stage one, they include the initial choice they made and then think of two or three other choices that were possible. However, after each of those choices are selected in the written simulation, they only lived one of them. Thus, they must write what the reaction or response would have been had they (or the subsequent student participating in the simulation) made each of the other possible choices. This process persists for at least four or five levels of the story, resulting in (theoretically), at the end of the fifth level, nearly a hundred possible outcomes.

It is worth noting that not every choice results in a different outcome, some choices might have the same effect and thus reducing the total number of outcomes at the end of the simulation. Regardless, however, the writing of the simulation requires the practitioner-author to think through the systematic impact of decisions several steps out.

This systems-oriented thinking is the type of thought process that the PELS authors were going through when they faced new problems or challenges in their daily work. They consistently reported feelings of greater efficacy in decision-making, as well as improved quality in the outcomes resulting from their decisions (Bernstein & Johanek, 2014).

The benefits of authoring can be brought into the classroom, as well. Darling-Hammond (2000) identified positive effects in the context of case study authoring, explaining that "when teachers or teacher candidates construct cases themselves, the writing of the case helps the writer learn to move between levels of abstraction: to understand the relationship between concrete details and larger principles or issues" (p. 530). This type of activity may be adapted easily to student-generated online simulations as class assignments.

Free available online survey tools, like SurveyMonkey, have the capacity to integrate what they call question logic. That is, if a person answers a survey question one way, they go to one subsequent question, if they answer it another way, they go to a different subsequent question, and so forth. It is not ideal to write extensive simulations with four or more levels of choices in a tool like SurveyMonkey. However, even a two-level simulation can be written in a rich way and support the types of systems thinking development witnessed among PELS authors and the abstractions noted by Darling-Hammond.

Once students identify a problem they envision (or have experienced), they write the story background. Then, they pose the first decision point. That decision may be an action that the "player" of the simulation must choose to take or, if the scenario involves a conversation or interaction with another person, the choices may be what they player will say. After identifying three or four options on that first level, the students then consider how the scenario reacts to each choice and describes that reaction. This could be a consequence of the action chosen or the verbal reply to the words that were chosen to be spoken. Finally, the student then considers the next level of choices, identifying two, three, or four choices as responses to each of the reactions to the first series of choices. This results in an, albeit rudimentary, two-decision simulation. Once a class of students have written simulations, they can be shared with peers and "played" by other members of the class. They can even be facilitated as described earlier. This allows both learning from authoring and learning from the facilitated application of the new simulations that were written.

Scalability of Online Simulations

Simulation as a modality for promoting discourse around practice in medical education (Cleland, Abe, & Rethans, 2009) and the more recent exploration of similar work applied in the field of education (Dotger, Dotger, & Maher, 2010; Walker & Dotger, 2012) has proven very effective in engaging students and enhancing learning outcomes. These models utilize a highly skilled cadre of trained actors (Petracchi, 1999) to simulate patients or other stakeholders and the use of those actors has been identified as a strength of those models (Finlay, Stott, & Kinnersky, 1995).

The challenge, however, for the broad use of simulations in courses across content areas is the inability to easily and efficiently scale the model, given the reliance on those skilled actors. This is a particularly difficult challenge for online learning where students tend to be broadly distributed across geographic locations. The costs associated with scaling simulated patient interactions has been a consideration in medical education, as well (Norman, Dore, & Grierson, 2012). The PELS online simulation model and similar types of online simulations have attempted to capitalize on many of the strengths evident in the human-based simulations, while allowing for easy and efficient scaling with fixed resources that are not tied to physical actors.

The value of rich multimedia simulation is the enhancement of the immersive experience (Bacon, Windall, & MacKinnon, 2011). That enhanced multimedia helps offset the loss moving away from human-based simulation. Simulations with extensive multimedia components can carry a relatively high cost to develop. However, while the upfront costs for producing those computer-based multi-media simulations may be high, they are fixed and one time, compared with the costs associated with human-based simulation that are repetitive, each time the simulation is run.

Rich multimedia can also result in extremely large files that, in the past, may have proven burdensome for online distribution. Today, bandwidth is far less a concern and access to "high speed computers and networks are commonplace in modern societies [thus] online delivery has become an efficient tool to overcome geographic diversity" and other challenges posed by the more labor intensive, actor-based models of human-based simulation (Cheng, Basu, & Goebel, 2009, p. 2). Simulations can be delivered and accessed in various ways online. PELS partners with education technology providers like Ed Leadership Sims to develop, publish, and host simulations in online, Learning Management System-accessible, formats.

FUTURE RESEARCH DIRECTIONS

Research into the effectiveness of the types of online simulations discussed in this chapter can best be broken into three categories: effectiveness of using simulations for learning; impact of authoring simulations on learning; effect of various production levels on simulation immersion and learning outcomes; and decision-making patterns that emerge among simulation users.

How Using Online Simulations Impacts Learning Outcomes

A simulation permits a user to explore approaches to a problem and experience the outcomes of various decisions in a realistic yet "safe" context. The insights, understandings, and skills thus gathered from participation can then be applied in real-life situations. A key area for future research will involve the exploration into how much learning takes place by completing the simulation itself compared with the value-added by highly skilled facilitation of discourse around the immersive learning experience.

How Authoring Online Simulations Affects the Thinking and Practice of the Practitioner-Author

Developing a simulation requires a person to reflect on, deconstruct, and reconstruct the process of thinking through a complex situation and making decisions in the face of uncertainty. More research is necessary to track the impact of authoring simulations on practitioners engaged in that work. Such research can then inform ways to integrate simulation authoring into courses to foster the systems-based thinking of students in courses while simultaneously building libraries of additional simulations that may be facilitated with the peers of the authors and even with future groups of students.

How Different Levels of Multimedia Production in Online Simulations Bears on Immersion and Learning

As discussed in this chapter, the greater the level of multimedia production of simulations, the greater the cost to produce. There is increasing scrutiny on costs and though even the more expensively produced multimedia simulations are less resource intensive than human-based simulation, it is worth further exploration of the value added from highly produced multimedia. Comparing learning outcomes using the same simulation that is provided in three versions (text-based, still-photo and audio-based, and full-motion video-based) can help determine the necessity for and value of the greater resource expenditure associated with multimedia production.

What Decision-Making Patterns Emerge from Participants in Online Simulations

The nature of "big data" today and the potential for wide distribution of online simulations may provide opportunities to explore the decision-making patterns of simulation participants. This can be a cursory look at the decision-making tendencies for large-scale quantitative analysis. However, comparative research can also be done through important lenses like diversity and social justice by producing the exact same simulation with character of different racial or ethnic backgrounds and exploring similarities and differences based on the identity of the characters in the simulations. This could provide powerful new insights into topics that extend even beyond the teaching and learning that are the primary objective of the simulations being used.

CONCLUSION

Online programs are now a well-established form of education, with over one third of all college students taking at least one computer-based course. Certain problems arise in the online classroom that do not typically occur in a brick and mortar setting, due particularly to the geographic distance between learners, as well as the possibility of learning in isolation that can occur in an asynchronous course. Some of the issues that should be resolved if an online setting is to be successful are actively engaging students, providing authentic learning experiences for the students, and providing low risk opportunities for experiential learning. Online programs must strive to meet the aforementioned student needs while simultaneously addressing scalability of the activities and exercises.

One way to meet the needs of students in a way that will potentially provide a transformative learning environment is through the use of online branching simulations. Online branching simulations provide a standardized experience that parallels that of the more traditional human standardized actors that have been prevalent in many programs from medicine to education. The simulations can be implemented as whole group synchronous activities, small group synchronous activities, or individual asynchronous activities. The online branching simulation addresses both the needs of student learners for engagement, authenticity, and low risk experiences that reflect what they will experience in practice post-graduation. However its greatest success may rest in the ability of the class to discuss, debrief, as well as learn and evolve from the decisions of others. Through the sharing and exchanging of ideas, students begin to understand that there are multiple ways to address a problem of practice and that often times there is no one "right" solution. This can become a transformative learning experience for students.

The applications for online branching simulations extend outside of the electronic classroom and into practice, as they also can be utilized for professional development. The same attributes that make it beneficial for pre-service students create opportunities for professional growth in a professional small learning community. In addition, there are merits to creating a branching simulation as a form of professional development. Each offers learners the opportunity to practice, grow, and potentially transform.

REFERENCES

Alerte, A., Brown, S., Hoag, J., Wu, H., & Sapieha-Yanchak, T. (2015). Teens as Teachers: Improving Recruitment and Training of Adolescent Standardized Patients in a Simulated Patient Encounter. *J Community Med Health Educ*, *5*, 350.

Allen, I. E., & Seaman, J. (2013). *Changing Course*. Academic Press.

Arbaugh, J. (2000). Virtual classroom versus physical classroom: An exploratory study of class discussion patterns and student learning in an asynchronous Internet-based MBA course. *Journal of Management Education*, *24*(2), 213–233. doi:10.1177/105256290002400206

Bacon, L., Windall, G., & MacKinnon, L. (2011). The development of a rich multimedia training environment for crisis management: Using emotional affect to enhance learning. *Research in Learning Technology*, *19*. Retrieved from http://www.researchinlearningtechnology.net/index.php/rlt/article/view/7780 doi:10.3402/rlt.v19i3.7780

Bandura, A. (1986). Social foundations of theory and action: A social cognitive theory. *The American Psychologist*, *44*, 1175–1184. doi:10.1037/0003-066X.44.9.1175 PMID:2782727

Bandura, A., Ross, D., & Ross, S. A. (1961). Transmission of Aggression through Imitation of Aggressive Models, 63. *Journal of Abnormal and Social Psychology*, *63*(3), 575–582. doi:10.1037/h0045925 PMID:13864605

Barnett, K., & Mattox, J. R. (2010). Measuring Success and ROI in Corporate Training. *Journal of Asynchronous Learning Networks*, *14*(2), 28–44.

Beckem, J. M., & Watkins, M. (2012). Bringing Life to Learning: Immersive Experiential Learning Simulations for Online and Blended Courses. *Journal of Asynchronous Learning Networks*, *16*(5), 61–70.

Bernstein, E., & Johanek, M. (2014). *Peer-2-Peer Professional Development: Practitioner Authors and Social Learning Through Online Branching Simulations*. Paper presented at the Immersive Learning Conference & Symposium, Charleston, SC.

Bernstein, E., & Sciarappa, K. (2015). *Online Simulations to Support Learning in Educational Leadership Professional Development*. University of Pennsylvania.

Bridges, E. M., & Hallinger, P. (1997). Using problem-based learning to prepare educational leaders. *Peabody Journal of Education*, *72*(2), 131–146. doi:10.1207/s15327930pje7202_8

Cheng, I., Basu, A., & Goebel, R. (2009). Interactive Multimedia for Adaptive Online Education. *IEEE MultiMedia*, *16*(1), 16–25. doi:10.1109/MMUL.2009.11

Cleland, J. A., Abe, K., & Rethans, J. J. (2009). The use of simulated patients in medical education: AMEE Guide No 42. *Medical Teacher*, *31*(6), 477–486. doi:10.1080/01421590903002821 PMID:19811162

Darling-Hammond, L., & Snyder, J. (2000). Authentic assessment of teaching in context. *Teaching and Teacher Education*, *16*(5), 523–545. doi:10.1016/S0742-051X(00)00015-9

Dawley, L., & Dede, C. (2014). Situated Learning in Virtual Worlds and Immersive Simulations. In J. M. Spector, M. D. Merrill, J. Elen, & M. J. Bishop (Eds.), *Handbook of Research on Educational Communications and Technology* (pp. 723–734). Springer New York. doi:10.1007/978-1-4614-3185-5_58

De Jong, T., & Van Joolingen, W. R. (1998). Scientific discovery learning with computer simulations of conceptual domains. *Review of Educational Research*, *68*(2), 179–201. doi:10.3102/00346543068002179

Delialioğlu, Ö. (2012). Student engagement in blended learning environments with lecture-based and problem-based instructional approaches. *Journal of Educational Technology & Society*, *15*(3), 310–322.

Dieker, L. A., Rodriguez, J. A., Lignugaris, B., Hynes, M. C., & Hughes, C. E. (2014). The Potential of Simulated Environments in Teacher Education Current and Future Possibilities. *Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children*, *37*(1), 21–33. doi:10.1177/0888406413512683

Dillenbourg, P., Järvelä, S., & Fischer, F. (2009). The Evolution of Research on Computer-Supported Collaborative Learning. In N. Balacheff, S. Ludvigsen, T. de Jong, A. Lazonder, & S. Barnes (Eds.), *Technology-Enhanced Learning* (pp. 3–19). Springer Netherlands. doi:10.1007/978-1-4020-9827-7_1

Dotger, B. H., Dotger, S. C., & Maher, M. J. (2010). From medicine to teaching: The evolution of the simulated interaction model. *Innovative Higher Education*, *35*(3), 129–141. doi:10.1007/s10755-009-9128-x

Dotger, B. H., Harris, S., & Hansel, A. (2008). Emerging authenticity: The crafting of simulated parent–teacher candidate conferences. *Teaching Education*, *19*(4), 337–349. doi:10.1080/10476210802438324

Dunleavy, M., Dede, C., & Mitchell, R. (2009). Affordances and limitations of immersive participatory augmented reality simulations for teaching and learning. *Journal of Science Education and Technology*, *18*(1), 7–22. doi:10.1007/s10956-008-9119-1

Fanning, R. M., & Gaba, D. M. (2007). The role of debriefing in simulation-based learning. *Simulation in Healthcare*, *2*(2), 115–125. doi:10.1097/SIH.0b013e3180315539 PMID:19088616

Finlay, I. G., Stott, N., & Kinnersky, P. (1995). The assessment of communication skills in palliative medicine: A comparison of the scores of examiners and simulated patients. *Medical Education*, *29*(6), 424–429. doi:10.1111/j.1365-2923.1995.tb02866.x PMID:8594406

Gijbels, D., Dochy, F., Van den Bossche, P., & Segers, M. (2005). Effects of problem-based learning: A meta-analysis from the angle of assessment. *Review of Educational Research*, *75*(1), 27–61. doi:10.3102/00346543075001027

Gokhale, A. A. (1996). Effectiveness of Computer Simulation for Enhancing Higher Order Thinking. *Journal of Industrial Teacher Education*, *33*(4), 36–46.

Green, E. R., Hamarman, A. M., & McKee, R. W. (2015). Online sexuality education pedagogy: Translating five in-person teaching methods to online learning environments. *Sex Education*, *15*(1), 19–30. doi:10.1080/14681811.2014.942033

Henneman, E. A., Cunningham, H., Roche, J. P., & Curnin, M. E. (2007). Human patient simulation: Teaching students to provide safe care. *Nurse Educator*, *32*(5), 212–217. doi:10.1097/01.NNE.0000289379.83512.fc PMID:17828022

Herrington, J., Oliver, R., & Reeves, T. C. (2003). Patterns of engagement in authentic online learning environments. *Australasian Journal of Educational Technology*, *19*(1), 59–71.

Herrington, J., Reeves, T. C., Oliver, R., & Woo, Y. (2004). Designing authentic activities in web-based courses. *Journal of Computing in Higher Education*, *16*(1), 3–29. doi:10.1007/BF02960280

Hooper, B. L. (2014). Using Case Studies and Videotaped Vignettes to Facilitate the Development of Critical Thinking Skills in New Graduate Nurses. *Journal for Nurses in Professional Development, 30*(2), 87-91.

Hyde, C., & Ferrario, K. (Producer). (2015). *Backchannel and Sidechannel Conversation in the Synchronous Virtual Classroom*. Retrieved from https://prezi.com/k2zbldynttcd/backchannel-and-sidechannel-conversation-in-the-synchronous/

Kantor, R. J., Waddington, T., & Osgood, R. E. (2000). Fostering the suspension of disbelief: The role of authenticity in goal-based scenarios. *Interactive Learning Environments*, *8*(3), 211–227. doi:10.1076/1049-4820(200012)8:3;1-D;FT211

Kotranza, A., Lok, B., Deladisma, A., Pugh, C. M., & Lind, D. S. (2009). Mixed reality humans: Evaluating behavior, usability, and acceptability. *IEEE Transactions on Visualization and Computer Graphics*, *15*(3), 369–382. doi:10.1109/TVCG.2008.195 PMID:19282545

Kuh, G. D. (2001). Assessing what really matters to student learning inside the national survey of student engagement. *Change: The Magazine of Higher Learning*, *33*(3), 10–17. doi:10.1080/00091380109601795

L’Heureux, R., & Kelley, L. (2014). *Inside Marine One: four U.S. Presidents, one proud Marine, and the world’s most amazing helicopter*. Academic Press.

Mezirow, J. (1997). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education*, *1997*(74), 5–12. doi:10.1002/ace.7401

Norman, G., Dore, K., & Grierson, L. (2012). The minimal relationship between simulation fidelity and transfer of learning. *Medical Education*, *46*(7), 636–647. doi:10.1111/j.1365-2923.2012.04243.x PMID:22616789

Peterson, K. D., & Finn, C. E. (1985). Principals, superintendents, and the administrator’s art. *The Public Interest*, *79*(1), 42–64.

Petracchi, H. E. (1999). Using professionally trained actors in social work role-play simulations. *Journal of Sociology and Social Welfare*, *26*(4), 61–69.

Robey, P. V., & Bauer, S. C. (2013). Change in University-Based Programs of Educational Leadership How Responsive Have Programs Been? *Journal of Research on Leadership Education*, *8*(3), 261–279. doi:10.1177/1942775113498375

Saba, T. (2012). Implications of E-learning systems and self-efficiency on students outcomes: A model approach. *Human-Centric Computing and Information Sciences*, *2*(1), 1–11. doi:10.1186/2192-1962-2-6

Samson, P. L. (2015). Fostering Student Engagement: Creative Problem-Solving in Small Group Facilitations. *Collected Essays on Learning and Teaching*, *8*, 153–164.

Spector, J. M., & Muraida, D. J. (2013). Automating Instructional Design. In S. Dijkstra, F. Schott, N. Seel, & R. D. Tennyso (Eds.), *Solving Instructional Design Problems* (Vol. 2, pp. 59–81). New York: Routledge.

Stahl, G. (2004). Article. In J.-W. Strijbos, P. Kirschner, & R. Martens (Eds.), Building Collaborative Knowing: What We Know About CSCL (Vol. 3, pp. 53–85). Springer Netherlands. doi:10.1007/1-4020-7921-4_3

Stahl, G., Koschmann, T., & Suthers, D. (2006). *Computer-supported collaborative learning: Cambridge handbook of the learning sciences*. Cambridge, UK: Cambridge University Press.

Valle, F., Almager, I. L., Molina, R., & Claudet, J. (2015). Answering the Call for 21st Century Instructional Leadership: A Case Study of a School District and University Job-Embedded Aspiring Leaders Partnership. *Open Journal of Leadership*, *4*(03), 86–101. doi:10.4236/ojl.2015.43009

Walker, J. M., & Dotger, B. H. (2012). Because Wisdom Can't Be Told Using Comparison of Simulated Parent–Teacher Conferences to Assess Teacher Candidates' Readiness for Family-School Partnership. *Journal of Teacher Education*, *63*(1), 62–75. doi:10.1177/0022487111419300

Wallace, B. A. (1997). *An Understanding of the Role of Socio-Cultural Learning: Using the Past To Maximize Potential for Future Academic Success*. Academic Press.

Wertsch, J. (1985). *The social formation of mind*. Cambridge, MA: Harvard University Press.

KEY TERMS AND DEFINITIONS

Authenticity: The sense that a learning event is realistic and connected to the real practice of the content that is being taught.

Branching Simulations: Linear simulations where a scene occurs, a set of choices are presented, and the story progresses down a path based on decisions made at each set of choices.

Experiential Validity: The validation of a product (e.g., a simulated problem of practice) based on the relevant professional experience of the person or people creating that product.

Immersive Learning: Context-rich experiences that place learners into roles and call for learners to interact with the context of the experience.

Scalability: The ability to efficiently and effectively replicate something that is done in a smaller context to reach a larger population without sacrificing characteristics that made it valuable in the smaller context.

Skilled Facilitation: Thoughtful and deliberate instructional decisions, particularly with respect to questioning, made by a trained instructor to foster rich discourse.

Social Learning Model: The facilitation of learning that involves collaboration and interaction among and between learners, with less focus on the facilitator.