Use of Immersive Simulations to Enhance Graduate Student Learning: Implications for Educational Leadership Programs

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Abstract

The purpose of this article is to present how one university incorporates immersive simulations through platforms which employ avatars to enhance graduate student understanding and learning in educational leadership programs. While using simulations and immersive virtual environments continues to grow, the literature suggests limited evidence of avatar technology currently used at the university level, especially in educational leadership preparation and other graduate level programs. The authors identify a step-by-step process to effectively employ the use of immersive simulations as a practitioner tool at the university level. This article provides a process for incorporating immersive simulations into graduate educational leadership programs that can be successfully duplicated to best support professional preparation of current and future educational leaders in developing best practices for stakeholder engagement, human talent management, instructional leadership, and other areas relevant to transformational leadership. The authors argue that immersive simulations do indeed better support graduate students.

Introduction

The current education reform movement began when A Nation at Risk: The Imperative for Educational Reform was released by the National Commission on Excellence in Education in 1983. Its publication has led to the longest sustained period of reform in American educational history. This report called attention to the need to improve public education and resulted in Americans losing confidence in the public educational system. This outcry prompted legislators to address the issue of America’s eroding public school system as presented in the report, which spawned multiple school reform models and sometimes unwieldy change efforts to improve the levels of education provided to America’s students. The result has been a series of education reforms leading to a gradual implementation of greater accountability for excellence in teaching and leadership at school sites throughout America.

The passage of the federally mandated No Child Left Behind (NCLB) Act legislation of 2001 represented one more step in this reform trajectory and was in response to continued failure of American students to achieve on a par with other industrialized nations particularly in light of the gap in achievement of low-income and Latino and African American students (US Department of Education, 2001). With the inception of NCLB, there was increasing pressure for higher quality teachers and leaders, more scripted curriculum aligned to state adopted standards, and more systematic assessments and interventions for those students who have not met grade-level standards at the proficient level. More recently Common Core State Standards have been implemented adding additional pressure to teachers and leaders.

As public schools in the United States continue to face these unprecedented state and federal demands to raise student achievement and close racial and ethnic achievement gaps, the role of university preparatory programs becomes increasingly important. The recently passed federal Every Student Succeeds Act (2015) gives state and local authorities more flexibility and discretion on approaches and setting achievement benchmarks. Increasing flexibility with greater accountability for learning outcomes, however, suggests the importance of research on university programs and their methods for preparing current and future school leaders to meet these high demands in their own schools or districts. Collaborative learning technologies, arguably both efficient and cost-effective, are among the distance education strategies universities have adopted to meet increasing demands (Gaskell & Mills, 2014; Hartley, Ludlow, & Duff, 2015). One such collaborative learning practice showing promise is the use of immersive simulations (Bautista & Boone, 2015; Beckem & Watkins, 2012), which provides leaders with non-threatening hands-on simulations that can reinforce leadership characteristics necessary to succeed in K-12 settings in the 21st century. While access to, or experiences with, immersive simulations or other collaborative learning technologies do not guarantee participants will become proficient in a particular area, there distance learning strategies do advance essential knowledge, skills, dispositions, and practices for adult learners (Killion & Treacy, 2014). Accordingly, school and district leaders responsible for the supervision and administration of distance learning, including collaborative learning technologies, may find participation in immersive simulation experiences at the university level beneficial in building prior knowledge for application in their own schools or districts.

LITERATURE REVIEW

Principal Leadership Practices

School leadership matters for school success. There is ample research demonstrating links between high-quality leadership and positive school outcomes. In fact, few researchers would disagree that the principal’s leadership is one of the most important factors underlying the success or failure of schools. Leithwood, Louis, Anderson, and Wahlstrom (2004) reviewed research on how leadership influences student learning and found that leadership is second only to classroom instruction among all school-related factors that contribute to what students learn at school. They found that the total direct and indirect effects of leadership on student learning account for about 25% of total school effects. This effect is primarily through creating a culture of high expectations and supportive learning environment for both teachers and students. This recognition of the important role of school leadership has led to an increased focus to recruitment and preparation of school leaders. Thus, we identify a step-by-step process of including immersive simulation technology that supports university graduate level educational leaders. We drew on two dimensions of principal leadership literature that appear most frequently: instructional leadership and transformational leadership. In particular, we identified principal practices that previous research has indicated are associated with successful school leadership and the potential uses of immersive simulations to further enhance current and future educational leaders in employing best leadership practices as identified by the literature. Table 1 summarizes the similarities and differences between instructional and transformational leadership characteristics found in two studies (Leithwood, Leonard & Sharratt, 1998; Robinson, Lloyd, & Rowe, 2008).

| Table 1. Similar and Different Characteristics of Transformational and Instructional Leadership |


### Instructional Leadership

The study of instructional leadership has resurfaced as a form of leadership that is essential to improve student learning (Hattie, 2009; Katz, & Dack, 2013) and was driven in large part by the effective schools movement of the 1970s and 1980s (Horn & Loeb, 2010). Spillane, Hallett and Diamond (2003) defined instructional leadership as “an influential relationship that motivates, enables, and supports teachers’ efforts to learn about and change their instructional practices” (p. 1). Liu (1984) asserted, “Instructional leadership consists of direct or indirect behaviors (by principals), that significantly affect teacher instruction and, as a result, student learning” (as cited in Dares, 1989, p. 97). These behaviors include communicating high academic standards, professional development enhancing student learning, classroom observations, and a school environment conducive to learning (Robinson et al., 2008). In his meta-analysis of 50,000 studies covering more than 80 million students, Hattie (2009) asserted that instructional leadership, as evidenced by an effect size of .36, has a greater impact on student results than does transformational leadership. Katz and Dack (2013) found that both formal and informal instructional leadership played roles in positively impacting curriculum, teaching and learning.

Hargreaves and Fullan (2012), on the other hand, emphasized the necessity of viewing other leadership models beyond instructional leadership. They argued for the power of professional capital development through teacher collaboration and asserted there is not one way to collaborate. They viewed instructional leadership as “micromanaging mania.” However, there is growing empirical evidence (i.e., Hattie, 2012; Marks & Printy, 2003) of the importance of an integrated leadership approach to include transformational and instructional leadership. The basis for including both stems from their different foci: instructional leadership attending to classroom pedagogy and the individual teacher development, and transformational leadership encompassing a broader schoolwide perspective, including the work of grade and department teams.

### Transformational Leadership

To understand how leaders bring about change in districts and schools, one approach has been to identify the behaviors of leaders who have transformed their organization (Bass, 1985; Burns, 1978). We drew upon the characteristics identified in the pioneering study of educational leadership by Leithwood, Leonard and Sharratt (1998). The behaviors they identified are: (a) establishing a vision, (b) setting group goals, (c) providing intellectual stimulation, (d) setting high performance expectations, (e) providing individualized support, (f) offering appropriate modeling, (g) establishing a productive school culture, and (h) developing appropriate structures. Marks (2013) found that more than 80% of school leaders claim to be primarily transformational leaders.

Priny, Marks, and Bowers (2009) conducted a content analysis of a subset of extensive case studies that extended and supported their earlier qualitative research of 24 elementary and middle schools (see Marks & Printy, 2003). In the quantitative study, they found that when principals displayed transformational leadership practices, strong correlations were shown with pedagogical quality (r = .86) and actual achievement (r = .85). The qualitative phase (2009) showed that school success was enhanced when principals and teacher leaders incorporated a transformational leadership approach to establish an intellectual culture (i.e., having a leader who encouraged innovation and creativity as well as critical thinking and problem-solving). In addition, these leaders modeled what it meant to be a professional educator, inspired their staff to produce their best efforts, elevated staff contributions, and expressed personal concern for colleagues. Their work helped to establish a link between instructional leadership and transformational leadership, showing the importance of trends to relationships and instruction.

### Leadership Preparation Programs

Numerous studies examining the effectiveness of preparation programs for educational leaders exist in the literature, including a growing body of empirically grounded research focusing on specific elements of professional learning deficits or needs (Dodson, 2014; Dunlap, Li, & Kladioko, 2015). Questions surrounding what constitutes the right balance between practical and theoretical preparation, however, remain a topic of discussion among scholars and practitioners alike (Davis, Leon, & Fulz, 2013). While the literature clearly supports a strong link between principal effectiveness and student achievement (Davis et al., 2013; Dodson, 2014; Lowrey, 2014), close examination of how education programs help principals prepare for their role has risen to importance only recently in the wake of a national focus on standards-based instruction. Such examinations, however, typically do not include university faculty and high level practitioners (Dunlap et al., 2015).

If there is a silver lining surrounding program redesign beyond mandated compliance, arguably, it may be found in the accelerated national focus on improving principal preparation and stronger vetting of the programs designed to prepare them. Traditional leadership preparation programs, once rooted heavily in the theoretical, are no longer the norm in most institutions of higher education (Dodson, 2014). According to Davis and his colleagues (2013) and Lynch (2012), among others, higher education programs have long debated best practices for designing principal preparation programs. Some areas of significant learning gains for educational leaders in higher education preparation programs include working with special needs students (Lynch, 2012), budget, finance, and site-based decision making (Dodson, 2014), and pedagogical or human resource management (Radinger, 2014).

In the twenty-first century, leadership preparation programs are evolving toward an integrated approach that blends field-based experiences and practical strategies supported with a theoretical context and targeted to strengthen the leader’s development in a specific area of need (Dodson, 2014). Attention to program evaluation by external reviewers, a best practice, has risen to the forefront as leadership preparation providers seek national accreditation, align programs more closely to national standards, or enact other measures of accountability (Parylo, 2013). The Interstate School Leaders Licensure Consortium (ISLLC) (2016) has identified seven primary standards that guide the work of educational program providers and review for effectiveness at the state and national levels, including program design, instruction, and implementation.

State and national policymakers, driven by decades of sociopolitical fallout associated with declining student achievement, have also contributed heavily to discussions with other colleges and universities as they collaborate to build more effective leadership preparation programs. In Georgia, for example, state rules governing requirements for educational leaders and the certification programs that prepare them have changed multiple times over the last twenty years. At times, colleges and universities must operate programs that meet multiple state certification rules in order to accommodate students enrolled for completion of an expiring program as well as those enrolling under an existing one (Georgia Professional Standards Commission, 2016). Additionally, attention to program evaluation by external reviewers, a best practice, has risen to the forefront as leadership preparation providers seek national accreditation, align programs more closely to national standards, or enact other measures of accountability (Parylo, 2013). We argue that incorporating immersive simulation technology as part of graduate preparation programs in educational leadership is a best practice that will not only enhance preparation programs but also better prepare current and future educational leaders in K-12 settings.

<table>
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<tr>
<th>Transformational Leadership (Leithwood et al., 1998)</th>
<th>Instructional Leadership (Robinson et al., 2008)</th>
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<td>• Vision</td>
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<td>• Individualized support</td>
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<td>• School environment conducive to learning</td>
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Historical Overview of Mursion/TeachLivE ™

One way in which higher education is further developing an integrated approach to blending theory and practice is through pedagogical tools of immersive simulation. This technology has the ability to target leaders’ specific needs and create authentic and practical experiences in which to apply theory. The use of simulation has been prevalent as a teaching and learning tool in a number of fields for centuries. Simulation was defined by McGaghie (1999) “as a person, device, or set of conditions which attempts to present evaluation problems authentically [and where the] student or trainee is required to respond to the problems as he or she would under natural circumstances” (p. 9). As technology has become increasingly integrated into the fabric of our existence, simulations have transformed from simple role-playing to those which are immersive and technologically driven. Both the pace of disruptive innovations and the proliferation of a wide variety of technologies have increased the exposure of the general population to immersive simulation and interactions with avatars. This type of technology, widely used in fields such as medicine, aviation, and the military, has been posited to be a powerful pedagogical tool particularly in higher education (Johnson, Smith, Willis, Levine, Haywood, 2007). One platform using this technology at over 75 universities across the nation is Mursion, formerly known as TeachLivETM (www.teachliv.org, n.d.).

Acknowledging the challenges of adequately preparing pre-service teachers to face the demands of teaching in the 21st century, educational researchers sought to create an augmented reality platform, (heretofore referred to more generally as immersive simulation), capable of providing a risk-free environment in which to better prepare teachers (Dieker, Hynes, Stapleton, & Hughes, 2007). To that end, they created avatars to be used in immersive simulation that would not only provide a risk-free environment, but would also afford a cost-effective method for increased access to learning opportunities, enhanced benefits of non-technological simulation, and personalized learning. Initial research regarding the efficacy of this platform and software in uses in higher education across the country indicates significant positive effects across the variety of areas examined (Brown, 2015; Straub, 2014, 2015) with usage now expanding into the realm of training pre- and in-service educational leaders. Recognized as an efficacious tool particularly where transfer of skills is critical (Christensen, Horn, Caldera, & Soares, 2011; Johnson et al., 2007), some in higher education educational leadership programs are exploring immersive simulation as a means to better prepare educational leaders.

DEVELOPING AND IMPLEMENTING IMMERSIVE SIMULATION

Depending on the platform used, the process for developing and implementing an immersive simulation scenario varies. Mursion’s software allows users to choose from a variety of avatars and to customize use through the design of a scenario planner, a tool much like a lesson plan that is used to guide the interaction between students and the avatar. Because this immersive simulation platform operates through both software and a human in the loop, the quality of the experience relies heavily on the design of the scenario planner. As with traditional pedagogical tools, experiences designed with specific objectives, opportunities for scaffolding, and targeted feedback combined with formative and summative assessments, increase the quality and efficacy of the interaction. Absent of intentional instructional design, immersive simulation has the potential to serve as a fun, but ineffective tool for promoting the development of necessary educational leadership skills. Thus we cannot overemphasize the importance of completing the scenario planner with a strong instructional design. We have found that doing so supports a learning experience that is transformational in an educational leader’s ability to hone their skillset and apply them in their work life. Figure 1 outlines the steps we found most effective when employing immersive simulations with our educational leadership students.

![Diagram](image)

**Step one: collaboration.**

Residency professors met over a series of months to explore the concept of using immersive simulation experiences with educational leadership candidates. Discussions centered primarily on determining potential outcomes for use of the simulation experience in meeting course goals and objectives, state and national standards for educational leaders, and state licensure requirements. The team also discussed possible simulation experiences, levels of student engagement, feedback protocols, ethical considerations, technology, and other factors. Reviewing potential outcomes for use of the immersive simulation software led residency professors to agree that experiences involving a broad range of interpersonal communication types, verbal and non-verbal, have the potential to lead to improved skills and greater self-efficacy for leadership candidates that they can, in turn, take back to their sites. While professional collaboration is ongoing, the initial phase completed with development of implementation strategies, assigned responsibilities, and planning next steps. An example of the Educational Leadership faculty collaborative planning framework is shown in Table 2.
Step two: goals and objectives.

Much time and attention were dedicated toward planning a series of exercises to meet specific course objectives across a series of eight weeks in advance of the first residency seminar in which the immersive simulation software was introduced. Residency professors worked closely with the university’s onsite TeachLivE™ Coordinator to ensure authenticity of the simulation scenarios and their strategic alignment with clearly defined instructional goals. These objectives work to ensure desired outcomes while targets help learners develop a keen sense of meta-cognition. Having a clear sense of each aid in the instructional design process. For example, immersive simulation can serve a variety of purposes such as an exercise simply to provide an opportunity for exposure to a situation, or as a tool to promote skill development. In the former, a candidate might have the learning target of conducting their first parent-teacher conference using data, while in the latter, the student is applying classroom management techniques to address an identified weakness. In the context of higher education, a professor might identify the need for a group of educational leaders to practice facilitating data-driven discussions and decision-making based on the outcome of the school’s most recent state testing. The professor would set up a scenario with the objective of affording an opportunity for educational leaders to practice leading a data-driven discussion. The educational leader’s learning target would include being able to effectively facilitate a data-driven discussion which leads to actionable next steps for those on the team. After identifying goals and objectives, the next task is to create a scenario for the immersive simulation (see Figure 2).

Step three: embedded events.

Simulation scenarios were targeted toward extended learning on communication skills that instructional and transformational leaders use regularly with various audiences; for example, teachers, professional learning communities (PLCs), parents, and other internal and external stakeholders. The simulation experiences we have used include a PLC meeting and a teacher post observation conference between the principal and teacher who was observed. In each scenario, there is one candidate who plays the role of principal (leader) while the avatar plays the teacher. During each simulation, the rest of the group is completing an observational and reflective feedback form.

Building relevant experiences with varying degrees of difficulty is a key component for effective use of the Mursion/TeachLivE™ simulation software. Scenarios involving educational leaders were constructed to direct the virtual presence, or avatar, in participating at degrees of intensity ranging from zero (none) to five (extremely high) for a period of approximately ten minutes. Prior to the simulation, educational leaders are provided materials that all participants will use during the simulation. They are also briefed in advance about the conditions of the scenario, but do not know the degree of difficulty they will meet until the simulation unfolds (Figure 2). In scenarios where the intensity level is high and the candidate engaging with the avatar feels overwhelmed, the participant may pause the simulation to receive direction from an instructor, discuss a possible response, or withdraw from the activity altogether.
Ten minutes in immersive simulation is roughly equal to 45 – 60 minutes of a real-world experience (Dieker, Rodriguez, Lignugaris/Kraft, Hynes, & Hughes, 2014). Although a scenario may require participants to draw from a breadth of knowledge (e.g., knowledge of curricular standards, cut off scores for a particular test, and school law) and employ a variety of skills (e.g., diffusing an angry teacher, data analysis, and creating an action plan) all in the same interaction, it is short in duration. Because the immersive simulation is generally limited to this brief interaction, a back story is developed that is shared with both the students and those running the immersive simulation. In the example provided, this might include details such as the educational leader’s explanation to her staff about why the school has organized into data teams, the purpose of the team, and how they will operate in these teams. Once this backstory has been developed, the professor then embeds events into the scenario. These events often include common patterns of thinking (both misconceptions and correct patterns) to ensure that the scenario mimics authentic experiences. In the scenario described here, the professor may highlight ways in which the data could be misinterpreted; astute observations regarding the data; suggestions for action steps which may or may not address the actual identified needs; ways in which the avatar, playing the part of a teacher, could push back on the data or the process; or questions that the avatar could ask. The more information provided in this realm, the richer the experience, particularly if the same scenario is being repeated with several watching prior to their participation.

Step four: implementation.

Immersive simulation has the advantage of simultaneously slowing and speeding the learning process. Using the pause simulation feature slows down the interaction and allows the student to regroup, seek advice, or even start over. It can also be used as a corrective measure if the professor observes the leader executing a skill improperly. In both cases, the professor can also provide coaching or chose to offer it after the interaction. Conversely, the fact that each interaction in the immersive simulation takes place over a brief time period speeds up the learning process by allowing participants to reflect on the correlation between their actions and outcomes. This experience of slowing and speeding the learning process can also serve to benefit those who are observing since students indeed learn from previous individuals’ mistakes providing a scaffolded learning opportunity that increases levels of mastery attained.

The professor must consider specifically how he or she will prepare the students for this interaction; how the interaction will flow; Will students use the “pause simulation” feature?, Will the professor coach during or after the session?, and what types of assessments will be used. This is referred to in the scenario planner (and in research on immersive simulation) as the action-review cycle (ARC) (Badiee & Kauffman, 2015; Dieker, Rodriguez, et al. 2014). To develop an effective scenario, it is important to consider all aspects of the ARC–before action, during action, and after action. Apart from this process representing research-based pedagogical practices, outlining each of the aforementioned components in the scenario planner ensures a clear understanding of the intended use and outcomes of the immersive simulation. Finally, the professor outlines the logistics of the scenario. For example, will students present in pairs, or on their own? How long will each simulation last, and will students observe others in the simulator? (Figure 3)
References


