An Exploration of the Relationship Between Simulation Interaction Models and Application:

High-Fidelity Simulations That Transfer to Leadership Roles in Education

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ABSTRACT

Research has yet to extensively examine the effects of the implementation of clinical simulations designed around leadership skills and their application in educational leadership preparation courses. Although simulations have been a part of the curriculum in the medical field, much remains unknown about how clinical simulations effect leadership instruction in educational courses and how those skills transfer to practice in real world situations.

The research outlined in this paper was part of a larger study aimed at evaluating the Teacher Leadership Quality Program (TLQP) Initiative funded through the New York State Education Department. The purpose of this TLQP grant was to enhance the development of school leaders within the existing teacher and administrative preparation programs at Syracuse University. The goal of conducting these investigations was to examine the outcomes of Simulation Interaction Models by exploring the perceptions and attitudes of TLQP participants to ascertain what, if any, knowledge, skills, and techniques they have transferred to their current leadership role after participating in leadership simulations.

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**Purpose of the Paper**

The purpose of this study is to examine the Simulation Interaction Model for Teacher Leaders, designed by Dr. Benjamin Dotger, and implemented by Dr. Joseph Shed at Syracuse University’s Educational Leadership Program. This model came about due to a perceived need in Educational Leadership programs to better prepare graduate students for leadership roles in a more authentic way. Borrowing from the medical model, Dotger, Dotger, & Maher (2010) sought originally to “bridge the classic gap between [novice teachers’] professional preparation and classroom practice” (p. 131) by employing the simulation interactive model in teacher and administrator preparation classes. Dotger (2009) examined the effects of the model on 429 pre-service and in-service teachers. Using standardized parents, students, or paraprofessionals in 13 different simulations, he found statistically significant growth for these teachers in specific domains. After analyzing the effects of clinical simulations on novice teachers, Dotger (2013) expounded upon the purpose of simulations “as formative learning experiences, helping novice teachers formulate, ‘try-on’ and practice their emerging identities as ‘teachers’” (p. xviii) as well as an opportunity to practice effective techniques for communicating with parents and caregivers. The next step was to develop simulations for graduate students pursuing administrative certification.

The School Leader Communication Model, where simulations have been implemented as formative assessment tools, served three purposes: (1) allowing the students to construct new knowledge and apply their learning in the next simulation; (2) informing the instructor how the student is progressing; and, (3) developing communication systems for learning through debriefing as a process for feedback. In a study examining the role of formative feedback, Higgins, Hartley and Skelton (2002) found that graduate students in higher educational settings seek feedback. Furthermore, they purported that students may “recognize the central importance of formative feedback for their educational development” (Higgins et al., 2002, p. 61). The purpose of this study is to describe the experiences of the TLQP student participants, after two Simulation Interaction Models, debriefing, and experience in the field.

**Theoretical Background**

For the purposes of this research, constructivism is the theoretical framework that supports the integration of simulations as an authentic learning experience. Learning should include an opportunity for students to practice and apply their new understanding in various meaningful contexts (Ertmer & Newby, 1993). “Understanding is developed through continued, situated use…and does not crystallize into a categorical definition” (Brown et al., 1983, p.33, as cited in Ertmer & Newby, 1993). Ertmer & Newby (1993) outlined the underlying assumptions of constructivism as: (1) the learner should have control to manipulate information; (2) learning should occur in a meaningful context; (3) information should be presented in a variety of formats; (4) learners should have an opportunity to employ problem solving skills; and, (5) assessment should measure the learner’s ability to transfer knowledge and skills.

The Simulation Interactive Model is based on these theoretical assumptions by which graduate students will activate prior knowledge during the simulation, employ problem-solving skills, and self-assess their abilities while learning from others during debriefing. Furthermore, simulations “front-load …challenging experiences- and provide opportunities to carefully deconstruct and evaluate approaches to simulated problems of practice…[preparing] future teachers [or leaders] for some of the disequalibration before their years of service begin” (Dotger, 2013, p. 11).

**Simulation Interactive Model**

According to Sauve, Renaud, Kaufman & Marquis (2007), simulations are defined as a classroom activity that imitates a system of reality, where students act out assigned roles (Hertel & Millis, 2002) without consequences (Gilley, 1990). Sauve, et. al., (2007) differentiated simulation-based learning from educational games by identifying the objectives of a simulation as: “a model of reality defined as a system; a dynamic model; a simplified model; and a model that has fidelity, accuracy and validity” (p. 251). Students “engage in authentic interactions with other individuals in discipline-specific environments” (Dotger et al., 2010). The model of reality can take on one of two forms – digital or concrete. For the purposes of this research, the concrete model is examined. Regardless of the form, the simulation should represent authentic problems of practice (Martin, 2003; Swanson & Ornelas, 2001).

*Medical model***.** For the last fifty years, the medical field has employed simulated interaction pedagogy to prepare future practitioners to effectively working with patients (Dotger, 2013). High-fidelity simulation offers diverse students a forum in which to advance their clinical judgment skills (Lasater, 2007). In a critical review of the literature surrounding simulation-based education, McGahie, Issenberg, Petrusa, & Scalese, (2010) highlighted best practices for conducting simulation-based education for medical students. McGahie et al., (2010) defined the following 12 items as best practices for simulation features: (1) feedback; (2) deliberate practice; (3) curriculum integration; (4) outcome measurement; (5) simulation fidelity; (6) skill acquisition and maintenance; (7) mastery learning; (8) transfer to practice; (9) team training; (10) high-stakes testing; (11) instructor training; and, (12) educational and professional context. Borrowing from the medical model, Dotger et al., (2010) sought to “bridge the classic gap between [novice teachers’] professional preparation and classroom practice” (p. 131) by employing the simulation interactive model in teacher and administrator preparation classes.

*Leadership model***.** For the Teacher Leadership Quality Program (TLQP) initiative, Dotger (2013) replicated the process for school administrative interns. In the medical model, an actual person plays the role of a standardized patient with symptoms or concerns. Similarly, during simulations for administrative interns in the TLQP, the standardized person might play the role of a teacher or paraprofessional during evaluation meetings. Since the evaluation process is an important piece of leadership (Marzano, 2003) and strong leadership positively correlates with student achievement (Waters, Marzano, & McNulty, 2003), administrative interns should practice these important skills prior to an actual meeting of this caliber to develop communicative competence (Habermas, 1981).

*Education model***.** Additionally, Dotger (2009) examined the effects of a simulation interactive model on 429 pre-service and in-service teachers. Using standardized parents, students, or paraprofessionals in 13 different simulations, he found statistically significant growth for these teachers in specific domains. After analyzing the effects of clinical simulations on novice teachers, Dotger (2013) expounded upon the purpose of simulations “as formative learning experiences, helping novice teachers formulate, ‘try-on’ and practice their emerging identities as ‘teachers’” (p. xviii) as well as an opportunity to practice effective techniques for communicating with parents and caregivers.

**Simulation Implementation Process**

The implementation process includes the following steps: (1) training standardized parents or personnel; (2) meeting and reflection; (3) debriefing; and, (4) feedback. After one simulation, the cycle is then repeated to provide the educational leader with an opportunity to apply new knowledge as the ultimate goal of teaching and learning is conceptual change (Biggs, 1999). The simulation process is cyclical; neither action nor reflection should overshadow the other (Dotger, 2013).

*Training.* The implementation process begins with a two-hour training course for the standardized parent/teacher, with a standardized individual protocol (Dotger, 2013). These participants are provided background information and character traits of the role, to include “voice, tone, nonverbal mannerisms, and important verbal triggers” (Dotger, 2013, p. 7). However, the educational leader does not have a script and is encouraged to interact naturally.

*Meeting and reflection****.*** The meeting of the standardized parent/teacher and the educational leader is video recorded. The meeting occurs in a simulated conference room or office for the purposes of addressing the authentic concern (i.e. parental concern or administrative concern). Following the meeting, the student watches the video to reflect on his/her interaction in light of the problem. Students are asked to complete a self-assessment of their approach. Additionally, they must select two segments of their video to present to the class -one representing an example of their skilled professionalism, and one representing a skill deficit (Dotger, 2013).

*Debriefing*. Following the students’ simulation experience and reflection of their performance, the entire class attends a debriefing process (Dotger, 2013). In the medical model formative feedback is sometimes delivered via debriefing sessions (McGahie et al., 2009). Dotger (2013) explained that during the educational simulations it is important to have every student experience the same protocol for the purposes of self and peer-assessment. The debriefing process serves as a formative assessment for both students and instructors. The process is repeated in an effort to “effectively balance action and reflection” (Dotger, 2013, p. 7).

*Feedback***.** Feedback to the student supports learning when students can identify the level in which they are at and how to attain desired level of achievement (Sadler, 1983, ) which is critical for effective learning (McGaghie et al., 2009). Students in the TLQP engage in self-assessments when reviewing their videos and informal peer assessment during the debriefing. Formative feedback (in this case the debriefing process) serves two purposes: (1) it allows the student to construct new knowledge and apply their learning in the next simulation (Vygotsky, 1998); and, (2) it informs the instructor how the student is progressing (Dieckmann et al., 2009). In a study examining the role of formative feedback Higgins et al., (2002) found that students in higher educational settings seek feedback. Furthermore, they purported that students may “recognize the central importance of formative feedback for their educational development” (Higgins et al., 2002, p. 61). One student commented that, “the debriefing caused me to think about the simulations in terms of monitoring …about the importance of not going into a meeting with people without context. “This drove my awareness of monitoring, building relationships, the necessity of observations [in my current position] prior to having a difficult conversation.”

*Transference of skills.*  “Transfer to practice demonstrates that skills acquired [through the simulation experience] generalize to real clinical settings” (McGahie et al., 2010, p. 57). In the medical field transference results in improved patient care (McGahie et al., 2010). In the TLQP initiative, transference of leadership skills should result in improved instruction and learning. Although it is considered a best practice, transfer of skills is not easily measured and thus not readily researched (McGahie et al., 2010).

Through the Simulation Interaction Model, administrative interns can “try on” their new roles during simulated evaluation meetings with standardized faculty and staff prior to “real life.” The Simulation Interaction Model of the TLQP supports administrative interns to engage in reflective practice through self-assessments while obtaining some formative feedback. Administrative interns should gain knowledge, skills, and techniques to better prepare them for the field and ultimately improve learning outcomes for school children. The focus of this study was to capture students’ stories that demonstrate the application of newly acquired skills and knowledge to a leadership role.

**Methodology**

 The purpose of this study is to describe the experiences of the TLQP student participants, after two Simulation Interaction Models, and debriefing. The goal of this research is to explore the outcomes of learning in terms of transference to practice.

 The research questions were:

* + 1. What do participants perceive as the value of the Simulation Interaction Model?
		2. What are the learning outcomes from participants engaging in the Simulation Interaction Model?
		3. How has the learning outcomes informed practice?

When participants engage in a simulation, they must activate prior knowledge, employ an approach to address the conflict, and assess their results; this cognitive shifting is continuous throughout the interaction experience. If the interaction is perceived as authentic, then the students are likely to perceive it as valuable, and relevant. Therefore, data has been gathered to measure participants’ perceptions of the value and authenticity of the simulations.

To examine how students create meaning from the Simulation Interaction Model, data were collected from participants as to their perceptions of their own knowledge, skills, and attitude prior to simulations, after simulations but before the debriefing, then after debriefing. Additionally, interviews were conducted to gather more specific information in terms of formative aspects of the simulation experience. The purpose of this data was to examine the metacognition and cognitive monitoring students employ during a cognitive disequilibrium (the simulation interaction) and how these processes inform the student/teacher for the next simulation and ultimately in their role as an educational leader. If instructors must bridge the gap between what a learner knows with that of new knowledge, it is important to measure what transformational learning has taken place. The students identify their approach prior and after the simulations, and repetition of the simulations the student will become better informed of and how to attain desired level of achievement.

*Data Sources*.In an effort to meet the challenge of documenting perceptions of participants, this project employed a three-pronged approach. Data were collected through direct observation of the classroom during a debriefing session, surveys of participants, and interviews of four student participants and one instructor.

Classroom observations were conducted during a debriefing session. The instructor led whole-group discussions focusing on two simulations. The discussions indicated that some students were surprised by the “abstinent behavior” of the teacher-actors. Participants described feeling unprepared for such a confrontational meeting. Many participants stated that they should have used a more direct approach to address instructional concerns. Participants further discussed the simulations in small groups. Small group members discussed the importance of developing an action plan prior to confrontational meetings and not talking off the cuff because of concerns of “unprofessionalism.” The class returned to whole-group discussion and viewed video clips of instructor-selected video clips of simulations. After each clip, the instructor asked the student in the video to describe their thoughts and feelings at the time of the clip.

Survey protocols were adapted from Horizon, Inc. and the Council of Chief School Officers Instruments and administered after the debriefing session of two simulation interactions. Data were collected from surveys (n=53) completed by graduate students currently in the TLQP program (n=27) after each Simulation Interaction Model (n=2). Participants were asked to evaluate the simulations using a five point Likert-type scale for the following items: the authenticity, the simulation process, the debriefing process, and their change of their leadership knowledge, skills, and attitude. Surveys yielded important information about the process of the simulations in terms of the transformational growth of graduate students from beginning, middle, and end of the experience and the opportunity for programmatic changes.

In addition to the surveys (n=53), semi-structured interviews (n=4) were conducted to explore the graduate student participants’ perceptions about their experience with the simulations and how it informed or may inform their practice. Interview questions further examined what the participants perceived as the primary issue needing to be addressed (staff complacency) and their previous experience in dealing with those types of situations. Participants were also asked to explain how their attitude may have changed after the simulation but before debriefing, as well as after the debriefing session. They were also asked if they had the opportunity to employ the new techniques or skills in an authentic setting.

In addition to the student interviews, a semi-structured interview (n=1) was conducted to explore the instructor’s perceptions of the simulation process and student learning outcomes. The questions asked about the instructor’s previous leadership experience, instructor training, and how the simulations have informed programmatic changes.

**Results and Conclusions**

 The analysis was designed to compare participants’ perceptions and understanding of their leadership competencies before the simulation, immediately after the simulation, and then after the debriefing sessions. The purpose of the design was to gain information about how students’ perceptions and attitudes changed throughout their experience. All participants supported the value of the simulation debriefing process affirming that it is an important part of the leadership program, providing feedback and support for understanding leadership situations and the reasoning behind choices. Participants acknowledged strengths in the simulation process, citing active listening, asking questions to drive the conversation; orienting the discussion to be student focused; and acknowledging the value of the faculty member who they were talking to. The graduate students also identified when they used concrete examples, and felt this helped the conversation about the simulations progress more naturally. Table 1 shows the percentage of students that agree to changes in levels of their leadership knowledge, skill, and attitude throughout the process.

**Table 1**

**TLQP Participants’ Perceptions of Self**

**Prior to Simulation, After Simulation, and After Debriefing**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Perceptions of Self** | **Prior to Simulation** | **After Simulation** | **% Change** | **After Debriefing** | **% Change** |
| **% Agree\*** | **% Agree\*** |  | **% Agree\*** |  |
| **Knowledge** | 40 | 51 | +11 | 69 | +29 |
| **Skill** | 42 | 46 | +4 | 54 | +12 |
| **Attitude**  | 57 | 59 | +2 | 67 | +10 |

 \**Percent agree includes those who responded “very good/very positive” to*

 *"good/positive" on a 5-point Likert-type scale where 1=very good/very positive*

 *and 5=very poor/very negative (n=53).*

Data collected indicated that participants increased their knowledge of leadership skills; for example students indicated an increase in their ability to deal with the cognitive content to interact within the simulated situations, after participating in the simulation (+11%) and after the debriefing sessions (+29%). Additionally, participants perceived an increased level of skills (e.g., having ability to perform correctly for specific interventions for the simulated situation) after participating in the simulation (+4%) and after the debriefing session (+12%). Participants also indicated that their attitude (feelings, emotions, values and beliefs about the simulations application to their learning) changed positively after participating in the simulation (+2%) but more so after the debriefing session (+10%). Table 2 shows the statistical analysis of comparing participants’ perceptions prior to simulations, after simulations, and after the debriefing session across domains.

**Table 2**

**Comparison of TLQP Participants’ Perceptions of Self**

**Prior to Simulation, After Simulation, and After Debriefing**

|  |  |  |
| --- | --- | --- |
| **Leadership Knowledge** | ***t*** | ***ɳ2*** |
| Prior to the Simulation compared to After the Simulation | 1.02 | 0.00 |
| After the Simulation compared to After the Debriefing |  3.34\*\* | 0.09 |
| Prior to the Simulation compared to After the Debriefing |  3.40\*\* | 0.09 |
| **Skill Competency** |  |  |
| Prior to the Simulation compared to After the Simulation | 0.63 | 0.00 |
| After the Simulation compared to After the Debriefing |  2.61\* | 0.05 |
| Prior to the Simulation compared to After the Debriefing |  2.11\* | 0.03 |
| **Attitude** |  |  |
| Prior to the Simulation compared to After the Simulation | 0.24 | 0.00 |
| After the Simulation compared to After the Debriefing |  3.27\*\* | 0.09 |
| Prior to the Simulation compared to After the Debriefing |  2.59\* | 0.05 |

 \**Mean values significant at p<.05; \*\* Mean values significant at p<.01;*  *ɳ2* = strength of association

 When comparing perspectives of participants before and after their experience during simulations, analysis indicated significant differences after debriefing across all three domains- leadership knowledge, skill competency, and overall attitude. In contrast, perspectives of participants were not significantly different from before and after simulations. These results support the literature that debriefing is a critical component of the simulation process (McGahie et al., 2010).

 For example, the participants’ perceptions of their leadership knowledge changed significantly over the course of the simulation experience (*t* [1,52] = 3.40; *p*<0.01, *ɳ2 =* .09) as well as, from the simulation to the debriefing session (*t* [1.52]= 3.34; *p*<0.01, *ɳ2 =* .09). This trend continues for both participants’ perceptions of skill competency and attitude. Participants’ perceptions of their skill competency changed significantly (*t* [1,51] = 2.11; *p*<0.05, *ɳ2 =* .03) and their attitude (*t* [1,52] = 2.59; *p*<0.05, *ɳ2 =* .05) over the course of the simulation process. Their perceptions also changed significantly between the time they completed the simulation to the time they completed the debriefing for both skill competency (*t* [1,51]= 2.61; *p*<0.05, *ɳ2 =* .05) and attitude (*t* [1,52]= 3.27; *p*<0.01, *ɳ2 =* .09). According to Tabachnick & Fidell’s (2007) proposed criteria for evaluating the size of a treatment effect, as measured by *ɳ2* , 0.01 - 0.09 explains a small percentage of change. In this analysis, the variance associated with the debriefing session improved participants’ perceptions in as much as 9% in some in instances.

 Participants highlighted the strategies and lessons learned that were helpful and relevant including the ability to develop relationships, share ideas, balance approaches, and the importance of developing the skill of active listening. Specific themes became evident when addressing students’ attitudes regarding the simulation. Ideas centered on the development of relationships by building rapport with stakeholders and being active listeners. Being able to access areas of need when working in conversations, staying on task, and being direct were all strategies participants perceived as important in helping to resolve issues during the simulations. One participant stated that they were nervous about the simulation but ultimately felt that the experience helped them but “gain a better perspective about the reality of people and situations [that educational leaders] will likely encounter.” Table 3 represents the student participants’ overall perceptions of the Simulation Interaction Model.

**Table 3**

**TLQP Participants’ Overall Perceptions of The Simulation Interaction Model**

|  |  |
| --- | --- |
| **Perception of Simulation** | **% Agree\*** |
| Well-organized | 96 |
| Valuable & Relevant | 93 |
| Realistic | 92 |
| Appropriate level of difficulty | 74 |
| **Leadership Skills**  |  |
| Modeling professional role realistic | 96 |
| Developed critical thinking  | 89 |
| Preparation increased | 87 |
| Understanding of leadership theory | 86 |
| **Value of Debriefing**  |  |
| Discussions supported understanding | 87 |
| Gained useful feedback | 83 |
| Helped to understand the situation | 83 |

 *\*Percent agree includes those who responded "slightly agree”*

 *to "strongly agree" on a 5-point Likert-type scale (n=53).*

After review participants perceived the simulation experience as realistic (92%) as well as, valuable and relevant (93%). They also expressed feelings of being better prepared (87%) and that the simulations supported their practice of modeling a professional role in a realistic manner (96%) and develop critical thinking skills (89%). The debriefing sessions were valuable for gaining feedback (83%), understanding the situation (83%) and the underlying reasons behind their approach (87%). One participant commented that the simulations helped them to “learn that there are different ways to address the same situation” and that the debriefing sessions helped to “reflect upon [their] own performance.”

In order to gain a more in-depth perspective of the simulations and their impact on individuals who participated in the project, two participants agreed to highlight their experiences through interviews and discussions of the process of simulation use.  ​

*Case study administrator:*  (student has completed simulations during his coursework; is presently working in the field) When asked about his experience handling the primary issues at hand, prior to the simulation, the administrator felt confident that “as an instructional coach, he had prior experience with these issues” presented in all three simulations. When asked about how he thought he handled the meeting, he admitted that during the review of his “video tape [he] watched himself saying things [he] didn’t agree with or things [he] didn’t believe in.” When asked about the debriefing sessions and if it changed his attitude or approach, he commented that, “I think I changed to be more direct when dealing with issues, to be more unapologetic, and to set high expectations.” When discussing what knowledge, skills, and techniques have transferred to his current leadership role, he talked about being proactive by “monitoring what people are doing and asking questions that lead to discussions…and begin with directness right from the start.” He talked more about having a direct approach as opposed to having to react to problems. When asked how the simulations could be improved, he suggested that simulations “could be better integrated in the continuum of skills.” He thought that it should align with the following learning sequence: (1) read theory/case study; (2) discuss problem/approach; (3) practice approach; (4) engage in simulation; and, (5) debrief. He felt that “we need to do the pre-work to make the simulation seem authentic, more aligned, seen as a third step as a culminating activity.” When asked about the value of the simulations, the administrator stated that, “the simulations were valuable in reflecting on my own skill set and [learning] how to handle situations in a different way.”

*Case study instructor:*  (instructor with over 35 years of educational leadership experience and three years of implementing simulations into her coursework) When asked about the benefits of utilizing the simulations as a teaching tool, the instructor emphasized the importance of the simulations as “it teaches [the students] what is not in the book [and what] has to be demonstrated. [Simulations] emphasize that you cannot learn leadership from reading about it; you can’t get it from case studies. Simulations round out courses [so that students better] understand different dispositions of how to handle difficult situations.” When asked about the future of the Simulation Interaction Model in the leadership program, the instructor discussed the need for additional simulation protocols to better prepare students for broader educational issues (i.e. inclusion and special education). The instructor is currently writing these protocols. When asked about changes to implementation, the instructor discussed the need for better integration; currently the simulations supplement the curriculum but she is currently working on integrating it into the curriculum.

**Implementation Issues and Limitations**

 Even though the results from this research are promising, implementation issues were identified and limitations exist. According to the literature, feedback through the debriefing should immediately follow the simulation experience (McGahie et al., 2010). The TLQP instructor indicated that “there are scheduling and logistical issues and sometimes the debriefing sessions occurred later than preferred.” It was also suggested that better integration of simulations within the curriculum would provide a continuum of learning (i.e. read theory, discussing theory, engage in a simulation pertaining to theory, and debrief).

 The unique course design of implementation of simulations limited the number of participant surveyed (n=27) as well as access to case studies (n=2). Future research could include data from multiple cohorts of graduate students who have been involved in these courses in the past. A limitation of the model is the lack of summative assessment. Although performance feedback, both formative and summative, ranked as number one and crucial for the success of clinical simulations in the medical field (McGahie et al., 2010), the TLQP does not currently use the Simulation Interactive Model as a summative assessment. Dotger (2013) cautioned the use of simulations as summative assessments until participants are completely adjusted to the simulation process. As more simulation protocols are developed and simulations are better integrated into the curriculum, grant administrators are likely to include some type of summative assessment in the future.

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