

# Principal Candidates Create Decision-making Simulations to Prepare for the JOB

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*Online simulations offer opportunities for trial and error decision-making. What better tool for a principal than to make decisions when the consequences will not have real-world ramifications. In this study, two groups of graduate students in a principal preparation program taking the same course in the same semester use online simulations differently. The control group accessed online decision-making simulations and practiced making decisions for the represented scenario. Using a peer apprenticeship model, the experimental group of students created simulations and decision trees leading to solutions of the same problem in an online tool called SimWriterSimplicity. While both groups of students indicate that online simulations helped them solve problems, students who actually developed their own simulations walked away with more leadership skills. This process offers principal preparation programs a tool for internship experiences that also accommodate the graduate student working full time.*

## Introduction

Learning to become a principal is vastly different from the training it takes to become a teacher. A principal must possess the knowledge and skills to teach and manage students and adults as well as the knowledge and skills required of leadership and supervision. Principal candidates come to the leadership preparation program with different teaching backgrounds and varied years of experience. Some candidates have led school committees or participated in union leadership positions while other graduate students are coming to the program to renew a teaching license. In either case, the candidates have most likely not been responsible for making decisions that affect adults, evaluate the skills of a teacher, handle difficult parent conversations, or forge partnerships with community members in support of the school. Instead, principals have had to learn on the job through trial and error. Performance as a school principal requires the management and operation of the building. The position is also expanding its expectations and skill competencies to manage and lead instructional improvement within a technology rich environment (Berry & Bravender, 2012). In a study conducted by Benjamin H. Dotger (2011) on the use of simulations to practice social interactions, a school leader explained, “When I started as an assistant principal, everything I learned was on the job, and there are times where, reflecting on them, there are things I would have done differently.”

Principal preparation programs have been criticized for not providing candidates with the skills necessary to begin their work as school leaders. There appears to be a gap between the preparation of school leaders and the actual readiness to become a principal. The Educational Leadership Constituent Council (ELCC) in 2011 published a revised set of standards for the development of school leaders in the National Council for Accreditation of Teacher Education (NCATE) preparation programs. It is clear from ELCC that the job of preparation programs is to develop in candidates a set of knowledge and skills that are demonstrated, practiced, and assessed during the graduate student’s college experience. Leadership preparation programs should include three dimensions:

1. Awareness – acquiring concepts, information, definitions and procedures
2. Understanding – interpreting, integrating and using knowledge and skills
3. Application – applying knowledge and skills to new or specific opportunities or problems (ELCC, 2011)

A review of the research on the effectiveness of university-based leadership preparation programs by Darling-Hammond et al. (2010) identifies specific program features that have a high impact on principal preparation. In this list, supervised field experiences are recommended as a significant component to leadership development. Field experiences provide the context to observe first-hand and participate in events specific to the job of the principal. While principal preparation programs are searching for internship models that provide candidates with optimal experiences, the reality is that the candidates work full time as teachers and their leadership “practice” is often piecemeal or episodic. In most cases, candidates take on the leadership tasks that can accommodate after school availability. Opportunities to practice the day-to-day activities of a principal are compromised.

Simulations have been used by the military for over 200 years in order to prepare soldiers for the problem solving strategy needed on the battlefield. Past battles provide the backdrop for issues or conflicts that must be solved quickly when in combat. Decision-making without the knowledge of the environment and potential consequences for alternatives is a shot in the dark.

“Seeing and understanding these relationships prepares the mind for decisions in a complex environment” (Rubel, 2006, p.110). While the simulation environment may not precisely resemble real life given the nuances of human interactions, the candidate has the benefit of trial and error practice to become a more informed decision-maker in similar experience in the future. The use of online simulations in principal preparation programs can become the field practice for such decision-making.

The purpose of this study was to compare the development and use of simulations as a pedagogical tool between two groups of graduate students taking the same leadership course, the same semester in a principal preparation program.

### **Theoretical Framework**

“The preparation of school leaders requires overt connections and bridging experiences between research and practice” (NCATE, 2011, p. 6). It is not enough to provide students with leadership theory, the steps to school improvement, or decision-making models. Leadership programs must implement pedagogical strategies that assist the learner to move from acquiring knowledge to the application of that knowledge. Benjamin Bloom (1956) theorized that learning takes place within the cognitive domain. He explains the cognitive domain as six categories of acquiring, comprehending and applying knowledge to deepening the learner’s understanding by analyzing the knowledge. Deep knowledge occurs when the learner is then able to synthesize and evaluate what is learned. This is the level at which the knowledge can be applied to different situations to solve problems in new ways. The pedagogical processes examined in this study are primarily represented in the cognitive domain. The six categories of the cognitive domain can be thought of as outcomes for learning.

The influence of Bloom is evident in a model developed by Edgar Dale (1969) to illustrate theories of learning. See figure 1. The cone-shaped model starting at the top of the pyramid illustrates a small percentage of what people actually remember when they read. A greater percentage of recall occurs when someone hears information, increasing when a person sees and hears information. As the pyramid expands to include what a person says and writes, so does the amount of the memory. Toward the bottom of the pyramid, Dale theorizes that experience in the forms of role-play, simulations, and direct purposeful experiences have the greatest impact on retention, with direct purposeful experiences being the most beneficial.

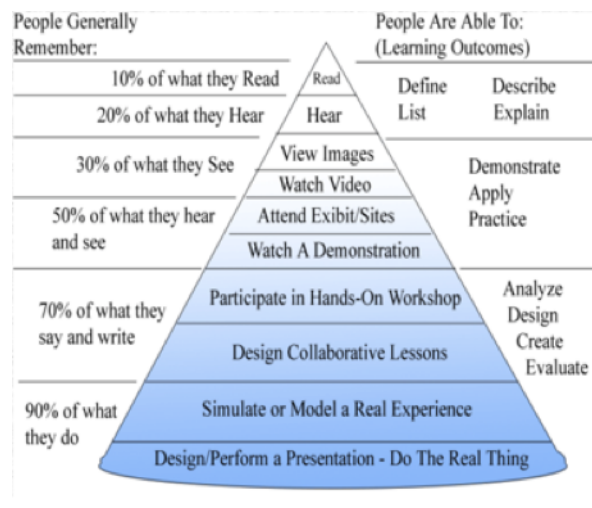


Figure 1. Dale's Cone of Experience

Source: Adapted from E. Dale, *Audiovisual Methods in Teaching*, 1969, NY: Dryden Press

Learning is an active process. Learners construct knowledge or new ideas by making meaning from information and experiences (Bruner, 1960). The selection and transformation of information, making decisions and then generating hypotheses during experiences frame the direct and purposeful experiences described by Dale. The closer an experience is to the actual on-the-job activities of a principal, the more likely the learner will use the concepts learned from the experience in a future setting. Designing realistic problems for principal candidates to practice decision-making constructs will reinforce and refine their skills.

The value of field experiences is derived from theorists expounding tenets of apprenticeship. Learning takes place by immersing students in a community of practice similar to the role for which they are being prepared. Students must participate in authentic activities in a situational context that reflects the cultural norms of the environment thus permitting students to "assimilate the covert aspects of that practice" (Brown et al. in Hung & Nichani, 2002, p. 7). The process of cognitive apprenticeship allows the learner to acquire, develop, and use the cognitive tools unique to the particular field through collaborative social interaction and the social construction of knowledge (Brown et al, 1989). Hung (1999) extended the theory of cognitive apprenticeship by examining the influence of peers and masters in the field. Dynamics of peer interactions provide a basis for stimulating and thought-provoking discussions that deepen the learning experience. Guidance from a professor or expert in the field creates further opportunities for the development of understandings and skills in the learner. Thus, the concept of Peer Apprenticeship is the working together of peers and masters "in the learning situation through the process of modeling-mirroring, scaffolding-submitting, and coaching and constructing" (Hung, p.6).

### Simulation

A meta-analysis of the simulation research indicates strong support for computer simulations in the learning process (Gokhale, 1996). Simulations can enhance students' ability to solve problems by offering stimulating environmental problems. Ebner and Druckman (2012) set the

stage for a comparative study on the design and authorship of simulations versus role-play and text-based simulations. They found that when students created their own simulations, students experienced enhanced short-term concept learning, deeper understanding of the concepts presented, long-term retention of the concepts, and higher degrees of motivation and engagement among participants.

Technology has moved to the forefront in today's college classes. Students come to the university with technology skills and experiences in online game playing. They use computers and technology in everyday actions. The work done by Ebner and Druckman (2012) does not use technology and the differences technology can offer in design and use of simulations versus paper-based resources. Technology provides the means to develop, shape, and facilitate learning (Berry & Staub, 2011). Internet-applications allow for greater access to simulations by participants, including the ability to test and track student performance. Participants can be allowed multiple attempts to solve a given problem (Driscoll, 2002). Resources are more easily manipulated in online simulations, providing opportunities for analysis and synthesis by the players (McLaughlan & Kirkpatrick, 2005). There is also a level of social interaction that enhances the online experience. Each group member of an online activity will search for similar patterns to determine if they may have something in common with other group members to ultimately learn content (Bravender, 2009). The interaction provides support, offers ideas from other participants, and probes the thinking of the participants.

### **Research Questions**

This study explored the development and use of simulations as a pedagogical tool for practicing decision making in a school context. Two groups of graduate students taking the same course during the same semester in a leadership preparation program using simulations in two different formats were compared.

Q1: What are graduate students' perceptions of their learning and development of skills when they *design* online decision-making simulations?

Q2: What are graduate students' perceptions of their learning and development of skills when they *participate* in online decision-making simulations?

### **Method**

This educational research study explored the experiences of graduate students in two graduate level courses that utilized SimWriter Simplicity simulation software as part of the course requirements. The control group worked through previously designed simulations. The experimental group not only worked through one previously designed simulation, but those students were tasked with simulation creation. Experimental student teams used district and community information to provide a context for the school scenarios they created. Along with selected concepts from the course, the experimental students determined the outcomes of the simulation (how the decision would occur), branching, realism of the scenarios, constraints, and the nature of decisions and consequences.

### **Participants**

All participants were pursuing a graduate degree in educational administration and supervision from a large public mid-western university. The majority of participants plan to use their degree

to obtain a leadership position in education. The control and experimental students were registered in two separate Individual and Organizations courses offered in the spring semester held in a hybrid format. Both classes met every other week from 5:00pm-8:00pm with a minimum of two hours of work to be completed online each week. The control group consisted of 24 students where the experimental group had 12 students.

## **Procedures**

Prior to any simulation exposure each participant was given a pre-course survey that asked questions related to simulation use in a teacher preparation program as well as perceptions of value and practice. A Likert Scale from one to five was provided for each survey item, with one as strongly disagree to five as strongly agree.

## **Case study assignment**

Next, both classes of students were asked to read the case study. The assignment contained a scenario that required the identification of actions and steps a principal would take while leading staff in an educational organization. Students submitted a written response to the case scenario. The assignment was graded based on the number of individual leadership actions and the number of actions that were collaborative.

After the case study assignments were submitted the control group of 24 students worked through three previously designed simulations, covering educational issues relevant to school leader decision-making. This was done in teams of three or four students. They explored a dress code dilemma, decision-making issues for a superintendent in the first month of employment, as well as job coaching with a hesitant teacher. In small teams the experimental group worked through the previously designed superintendent simulation just like the control group. After walking through one similar simulation, the experimental group was tasked with creating two fully designed simulations.

## **Software**

SimWriter Simplicity is a windows-based software system that allows users to create decision-based learning simulations. Users can import Power Point slides or select from a variety of templates to facilitate the design process. A library of pre-made graphics, buttons, characters, and environments are provided enhance different parts of the simulation. A branching ability is provided in the design templates to allow for decision options linked to specific outcomes. Decision options can be assigned point values that lead to a final score at the end of the simulation. This allows for quick performance ranking from the designer set of learning objectives. Simulations can be exported as flash or html files.

## **Experimental group**

The experimental group of 12 students walked through the previously designed simulations as a demonstration of how a completed simulation may look and the design options available within the simulation software program. Once complete, the students were connected with three other classmates to create a simulation related to the course topics of Individuals and Organizations and school level leadership. Each team was tasked with working through the branching,

decision-making options, and fully developed simulations using SimWriter Professional. Each team of experimental group students followed a 5-stage process of simulation development. The framework for the design of the simulations followed a five-step process commonly used in environmental management simulations occurring over a five-week period. “The various stages and type of communication technology used have strong similarities to other online role-play simulations” (McLaughlan & Kirkpatrick, 2005, p.2). For the purposes of this study the five-step design was tailored to fit within a sixteen-week hybrid course format.

Stage 1 was the Briefing Stage. Participants became familiar with the concepts and purpose of simulation software initially through an instructor-led discussion. The student groups discussed possible topics and areas of interests that might be best suited for decision making via simulations. Each group was provided a list of parameters for a completed simulation. Each group would develop a simulation with a minimum of three objectives that the simulation user should explore through the process. There was to be a defined learning goal, information to prepare the participant to walk through the simulation, a vision statement for the educational institution in the scenario, any pertinent background information about the organization being examined including documents and any outside resources. In addition each group was tasked with creating a list of characters and pertinent attributes.

It was recommended that each team use graphics and an easy to read font. Each team was required to have a minimum of four decision points within the simulation. Each decision would allow the user to choose between three or more options, typically denoted as good, mediocre, or bad. With each choice the experimental group was expected to provide feedback to the simulation user before moving to another part of the simulation scenario. Each decision option and feedback would be tied to one or more of the objectives created by the groups at the beginning of this stage.

Stage 2 was the Adoption Stage. In this step the groups discussed their observations and experiences as professionals in the education field. Each student spent one or two weeks researching sources of school district data and topics related to the educational administration and supervision of a specific scenario of interest to assist in developing a simulation. Each group adopted a persona and background for all of the possible decision makers and catalysts that would be typical in the chosen scenario. At this stage the experimental group attended a training session on how to use the simulation software. A question and answer session allowed them to see a variety of design models that could be created within SimWriter Professional.

Stage 3 was the Interaction Stage. Each group compiled a list of roles that would likely play out in the given scenario for each group. These might be protagonists that show up after various decisions are made, for example, those that might interact with the principal in solving the problem, i.e. staff, teachers, parents, or other administrators in the district and community. Each group had to decide on a scenario and a catalyst for a decision by the educational administration persona that represented the group. The catalyst, or the stressor, was what caused the persona to begin making decisions in the simulation. After that initial decision the persona would encounter a series of events within the scenario leading to more decision-making points. Each group had to choose a classification for each possible decision option as noted in the adoption stage. Each team could use any combination of choices from good, mediocre, and bad. The simulation user must decide on only one option. Thus, participants were required to apply their understanding of various stakeholders and the simulated environment gained during the Briefing Stage to know at which decision option classification each possible option would fall.

Stage 4 was the Forum Stage. During this stage the participants were set to gain an

understanding of multiple perspectives about the educational scenario being presented. These perceptions come from the motivations and values ascribed by the team to each entity and interaction within the simulation. As the understanding of motivations and values of the simulation persona and constituent groups was determined, the motivations and values of the constituent groups were reshaped through the consequences of the good, mediocre, or bad decisions that were made by the persona in the simulation. During this stage the groups were able to discuss the logic of each decision and the connections the decision had to the school district data. Discussions would happen at each decision point, but this stage created a deep focus on the realistic nature of the decision options. The end goal was to present a simulation user with three viable options. All might create an end to the issue, but at least one option would be the most ideal for an educational leader. The realism discussions were informed by participants' previous experiences and classroom content. In this stage, the scenarios, artifacts, and decision trees were written into SimWriter Simplicity files.

The fifth and final stage was the Debriefing Stage. A completed simulation involved having a defined process of decisions in an educational administration context, appropriate interactions by the developed personas, text presented, order of operations designed, and graphics used to enhance the visuals noted by each participant. Students presented the final simulation to all of the other groups and the instructor. Each group walked through the cycle of the educational administration persona in the scenario and the various decision point options related to the topic of the simulation.

After the experimental groups presented the first simulations, these students were tasked with completing a second simulation. The teams continued with the same members as in the first round of simulation development. They had two weeks to complete the design and background information. The second time through creation, the teams were pushed to consider if the poor decision options they created were truly realistic. Would a leader be in a principal role if there were a history of poor decision-making? If not, then that decision option would be thrown out and replaced with something that seemed more realistic. The end goal was to present a simulation user with three viable and realistic options. All options were expected to create a realistic end to the issue, but one option would be the most successful for an educational leader. Then another two weeks were provided to actually create the simulation using the software with appropriate branching with text and graphics.

### **Revisiting the case study assignment**

Toward the final weeks of class both the control and experimental groups were given a second case study assignment. Just as in the initial assignment, this last piece was a scenario, which focused on a school leader identifying the need and steps for school vision and organizing and leading staff to achieve in that effort. Just as in the first assignment, students completed the assignment on their own. It was graded in the same format as in the first case study assignment. Once all simulation work and case study assignments were completed, both classes of students participated in a post-course survey related to the role of simulations in leadership preparation programs. It was the same survey that was provided earlier in the course.

### **Results**

The scores from the initial case study assignment and final case study assignment were examined in SPSS. A bivariate correlation test revealed a statistically significant strong Pearson correlation



(.818) between the scores from the initial case study assignment from all students and those scores on the final case study assignment of students in the experimental group that were part of the simulation creation process. This correlation was significant at the .01 level. No correlation was found from the initial case study and final case study from those students who only worked through previously designed simulations.

Table 1

*Correlation of Initial and Final Case Study Assignments*

	Case Study Initial Attempt
Case Study Final Attempt Control Group	.020
Case Study Final Attempt Experimental Group	.818**

*\*\*significant at the .01 level*

An initial correlation among all pre and post-course survey 15 variables was calculated and examined for variance. Six major variables (V1-V6) were identified after ten survey questions were collapsed into a single variable (V1). This was determined using factor analysis through SPSS. V1 consisted of the perceptions of simulations in practice, such as learning new skills or how simulations might seem useful in future on-the-job decision-making. Variable 2 (V2) was perceptions about the ability of simulations to solve school-based problems. Variable 3 (V3) was perceptions about the ability of simulations to evaluate case studies. Variable 4 (V4) was perceptions about the ability of simulations to help develop new skills to understand current school based problems. Variable 5 (V5) was level of program of the participants such as master or doctoral program. Variable 6 (V6) was perceptions that simulations developed by individuals, or in teams, as helpful to overall learning. A bivariate correlation was run among variables 1-6. Five correlations of statistical significance were revealed (Tables 2 & 3).

**Control group**

Table two provides the statistically significant findings related to the control group in the simulation study. Two of the findings were significant at the .01 level and two were significant at the .05 level.

Table 2

*Correlation matrix of control group*

	Sims in Practice (V1)	Solve school-based problems (V2)	Evaluate case studies (V3)	Developed new skills to understand school based problems (V4)	Program Level (V5)	Building simulations to general learning (V6)
Sims in Practice (V1)	1	.995**	.685**	.635*	-.215	-.249
Solve school- based problems (V2)		1	.657*	.237	.068	-.127
Evaluate case studies (V3)			1	.017	-.348	-.158
Developed new skills to understand school based problems (V4)				1	.271	.231
Program Level (V5)					1	.388
Building simulations to general learning (V6)						1

\*significant at the .05 level

\*\*significant at the .01 level

A statistically significant relationship (.995) was revealed between the control group simulation in practice variable (V1) and the control group solve school-based problems (V2) at the .01 level. Participants who indicated in the pre-course survey that simulations would be helpful in practice reported in the post-course survey a significant change in their perceptions toward the helpfulness of simulations in preparing them to solve school-based problems.

A statistically significant relationship (.685) was revealed between the control group simulation in practice (V1) variable and the control group when evaluating case studies (V3) variable at the .01 level. As participants identified in the pre-course survey that simulations would be valuable in practice reported in the post-course survey a significant change in their perceptions that simulations would help them in their ability to evaluate case studies, make judgments about new ideas, and solve problems.

A statistically significant relationship (.635) was revealed between the control group simulation in practice (V1) variable and the control group developed a new understanding variable (V4) at the .05 level. These participants identified in the pre-course survey that simulations would be valuable in practice, they significantly reported in the post-course survey that simulations helped them to develop new skills to understand current school based problems.

A statistically significant relationship (.657) at the .05 level revealed that in the pre-

course survey those participants who felt simulations would help them in their ability to evaluate (Bloom, 1956) case studies (V3), significantly reported an increase in their perceptions toward the helpfulness of simulations in preparing them to solve school-based problems (V2).

### Experimental group

Table three provides the statistically significant findings related to the experimental group in the simulation study. A statistically significant relationship (.712) was revealed between the experimental group simulation in practice variable (V1) and the experimental group solve school-based problems variable (V2). The finding was significant at the .05 level.

Table 3

*Correlation matrix of experimental group*

	Solve school-based problems (V2)
Sims in Practice (V1)	.712*

*\*significant at the .05 level*

As participants who had developed, designed, and created simulations indicated in the pre-course survey that simulations would be helpful in practice reported in the post-course survey a significant change in their perceptions toward the helpfulness of simulations in preparing them to solve school-based problems.

### Limitations

The Individuals in Organizations course was the first course for some of the students beginning a Master's Program. A concern is raised as to the ability of first-year graduate students who may have only a few years of teaching experience, to participate fully in the simulation. Is there a time in the design of the simulation or the development of the decision-making tree where the new student becomes confused or is unable to make connections between administrative practices and the scenario? Additionally, the expectations a new student brings to graduate school, and their period of adjustment, may be influenced positively or negatively by having to jump in to the real world thinking of a principal.

The results of this study may not solely rely on the use of simulations. The semester long course provides additional instructional activities that may also contribute to the students' understandings and development of leadership skills.

The need for the study stems from a lack of research on educational leader focused simulations. The usefulness of simulations in other disciplines is evident, but more research on the role of decision-making specifically in educational institutions should be amassed. The data collection is limited to case study assignments as well as pre and post-course surveys completed by the participants. The number of variables that needed to be collapsed fell into two categories. They were categories about practice and perception of knowledge acquisition. These questions should be reviewed further for future studies.

## Discussion

Simulations contribute significantly to graduate students' perceptions of their learning and development of skills when they participate in pre-designed online decision-making simulations. In addition, significant evidence reveals that the process of designing decision-making simulations is valuable to the learning and development of skills as perceived by graduate students in an educational leadership preparation program. The use of simulations and the benefit to students fall into two areas: course outcomes and on-the-job preparation.

Case studies are commonly used in college leadership courses as tools for examining situations that may occur in real life related to course outcomes. Students share what they might do if confronted with the same situation, each student learning from the other through the discussion. Results from this study indicate that the use of simulations positively effect students' experiences in the course in such a way as to increase their capacity to respond to a case study scenario related to course outcomes. The use of simulations in the course demonstrates leadership skills students are developing thus, preparing them decisions in a complex environment (Rubel, 2006).

Participants in the study perceive an increase in their ability to understand and solve problems in their future jobs as principals. Transfer of knowledge from college courses to application in the field should be the goal of principal or leadership preparation programs. When given opportunities for practice and feedback as in the online simulations, students indicate they are more prepared to handle the same situation should it occur on-the-job when they are principals. Simulations not only provide the practice for graduate students, but the relevance to the learning occurring in their college classes. It bridges the gap between research and practice for the student (NCATE, 2011).

The process of designing simulations appeared to have even further implications as evidenced by the experimental group of students. Two pieces of statistically significant data were presented, and they are significant for faculty in leadership preparation programs. The experimental group of students who worked in teams to develop a model of decision-making processes of an educational leader had significantly higher scores on the individual case study assessment. The case study assessment had each student outline a realistic plan to make decisions and lead a staff at the school. The individuals who were part of the experimental group demonstrated significantly more leadership and collaborative actions in the final case study than the control group. The process of designing a simulation requires more thought and discussion among the participants. Participants have to analyze all of the different paths a decision might lead and the implications of those steps to determine the best and/or worst courses of action based on their course readings and observational experiences. The five-step process that guided students through the design of the simulation is an example of Bloom's (1956) taxonomy of learning at the highest level.

The ability to solve problems related to school leadership creates self-confidence within students and a schema to tackle similar issues in the future. This finding reinforces the concept expressed in Cone's Model of Learning (1969). The closer the instructional activity comes to the actual experience, the more significant and long term is the learning. Principal preparation programs can use online simulations to provide the readiness needed in candidates to assume the job of principal. They can also use simulations as a tool for novice principals requiring a refresher course or professional development.

A peer apprenticeship model provides graduate students in a leadership preparation

program internship experiences that are enhanced by peer interactions and faculty mentoring. Given the time constraints of full-time teachers to participate in on-the-job training, simulations can be used as some or all of the internship experiences. Using online capabilities such as video conferencing and discussion boards, mentor and peer interactions can still occur in response to a given simulation.

The software benefit of the simulations is less clear as this element was not isolated in the study. The software allowed a more dynamic environment for decision-making with the possibility of creating a level of anticipation among participants as they selected a decision option and then waited to see their results. The students designing the simulations however, did not share the same experience of select and wait. Instead their experience looked more like a web of options and outcomes. The flexibility built into the software allowed students to build their own models for the scenarios thus, constructing their own knowledge one decision at a time based on their course research. This suggests that their use of the software influenced a stronger demonstration of leadership actions in the final case study.

The second point is that the template in the software was an accurate representation of how decisions play out in schools. If this were true then the decision-making tree presented in the software tool could provide a framework for decision-making in leadership courses. Exploring the schema principals use to address school related issues and how this relates to the decision-making tree presented in the software could help clarify the role of technology in simulations.

Online decision-making simulations offer promise for leadership preparation programs as well as principal professional development. The online environment offers flexibility of access to the simulations and two-way communication for practice and mentoring. Opportunities to develop and practice leadership skills in a simulated environment can translate into more informed decision-making in the future.

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