Use of Online Cases to Develop Administrative Decision Making

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DRAFT 04/09/10
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Presented at the annual conference of the American Educational Research Association, Denver, CO, May, 2010.

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Statement of Purpose

For most professional preparation programs in education, as well as those in business, law, and medicine, the persistent challenge has been to support students' ability to apply theory to practice (Labaree, 2004). This certainly has been the case for K-12 leadership preparation programs with numerous studies identifying weaknesses in the application of declarative knowledge acquired in courses, consisting primarily of theory and research on school leadership, to the practice of leading in specific contexts (Darling-Hammond, LaPointe, Meyerson, & Orr, 2007; Leithwood, Jantzi, Coffin, & Wilson, 1996; Levine, 2005; Murphy, 2006; Young & Crow, 2007). At its core, professional practice involves the definition and solution of problems that require specialized knowledge to inform the decision making process (Schön, 1983). Therefore, to prepare professional practitioners such as school leaders, it is necessary to cultivate the development of specialized declarative knowledge along with the proceduralized knowledge, such as decision making, to enable them to address authentic problems of practice. Both forms of knowledge production have equal value and importance in a preparation program as noted by Leithwood and his colleagues in their research on the Danforth program graduates: "The challenge for developing truly effective leader preparation programs is to build them around robust theories relevant to the current and future work of school leaders and to offer forms of instruction that lead to proceduralized knowledge consistent with such theories" (1996, p. 341).

Program features that cultivate both these types of knowledge have been found to be associated with perceptions of effective leadership by program graduates (Darling-Hammond, LaPointe, Meyerson, & Orr, 2007; Leithwood, Jantzi, Coffin, & Wilson, 1996). These features include strong and coherent curriculum, authentic leadership experiences, development of situated cognition, and the fostering of real-life problem-solving skills. More specifically Portin, Scheider, DeArmond, and Gundlach (2003) argued that administrators in training would benefit from additional and better opportunities to learn to diagnose and interpret problems and make decisions in concert with others about leading a school—attending especially to today's accountability press. Case methods of instruction, problem-based learning and field-based internships have been advocated as effective means of fostering the application of knowledge to authentic organizational problems and helping students make the transition to a world of practice (Darling-Hammond et al., 2007; Murphy, 2006; Orr, 2006). These pedagogical strategies offer students an opportunity to consolidate their declarative (content) knowledge from coursework and to begin to develop procedural (cognitive processes and skills) and contextual (understanding of conditions in a particular situation which influences action) knowledge (Marzano & Pickering, 1997; Taylor, Cordeiro, & Chrispeels, 2009).

If the field of leadership preparation is to meet the challenge of making programs more relevant to the future work of our graduates who primarily become practitioners, greater attention must be given to strengthening innovative pedagogies that develop the full range of declarative, procedural, and contextual knowledge (Taylor, Cordeiro, & Chrispeels, 2009). A newly developed online delivery model for case methods, Educational Theory Into Practice Software (ETIPS), has been designed to scaffold one type of procedural knowledge, administrative decision making. The cases are set in a variety of virtual, yet realistic, school settings for leadership preparation students that enable students to engage in a highly structured decision-making process and receive feedback on their thinking. This learning environment offers multiple opportunities to practice decision making and develop the habits of mind critical to the practice of school leadership. This paper reports on the first year findings of student ability to formulate plans of action by assessing actual case responses in this online environment. The findings have implications for the

instruction and assessment of student decision-making skills within preparation programs and future program development to support student understanding of key leadership tasks.

Despite the potential benefits of case methods of instruction, the broad appeal of cases to instructors and their growing use in teacher education (Merseth, 1999) and leadership preparation (Murphy, 2006), there is little empirical evidence of specific learning outcomes for students. Merseth noted that the "conversations about case-based instruction over the last two decades has been full of heat, but with very little light" (p. xiv). Much of the work in teacher education, for example, has been deemed "teacher research" because studies were more descriptive and not conducted using rigorous research designs (Lundeberg, Levin, & Harrington, 1999). The purpose of this study was to begin building the empirical foundation for the use of cases within leadership preparation programs.

Theoretical framework

In a recent review of the research foundation for educational leadership, Smylie and Bennett (2005) remark on the paucity of empirical research regarding the knowledge, skills, and dispositions of school leaders. They note one area of promise, however, is the positive relationship that has been found between "principals' problem-framing and problem-solving skills and their orientation toward instructional leadership and ability to solve problems" (p. 143). Research in this area has confirmed the centrality of problem-solving (Copland, 2003; Leithwood & Steinbach, 1995) in the work of school leaders and established that these skills can be developed in individuals. Ideally curriculum and pedagogy for leadership preparation programs should "consciously build students' schemata through authentic experiences and in a manner that fosters the progression from novice to competent during university study" (Taylor, Cordeiro, & Chrispeels, 2009, p. 330). Case methods offer a rich pedagogy for developing expertise along this continuum.

Decision-making and problem solving models are related closely in the literature, intertwined in practice, and involve a very similar set of steps as delineated by a number of researchers (Beyer, 1987; Hoy & Tarter, 1995; Marzano & Pickering, 1997; Leithwood & Steinbach, 1995). Models from both traditions were reviewed and adapted to identify the key procedural knowledge to emphasize in the ETIPS cases. The terminology of decision making, as opposed to problem solving, was chosen in order to cast the work of school leadership in a more positive, proactive light. Drawing on the work of Davis and Davis (2003), we define decision making as the "specific process that an individual or group engages in to solve a problem" (p. 37). The nature of decision making obviously differs substantially based on the contextual circumstances such as the quality of available information, clarity of the fundamental problem, and the range of possible resolutions. Hoy and Tarter (1995) identify six models of decision making in their seminal work on the subject. The model reflected in the ETIPS application is most similar to "satisficing," which is considered a good fit for a given situation when incomplete information about a problem is available but discernible satisfactory outcomes are possible, given the opportunities and constraints of a situation. They assert that "decision making is the sine qua non of administration – the process by which organizational problems are addressed, solved and implemented (p. 7)," acknowledging it as a fundamental skill to develop in leadership preparation programs.

Description of the Online Cases

The online cases used in this study were the ETIPS leadership cases, which are designed to offer students multiple opportunities to practice applying declarative knowledge to the decision-making process within virtual, yet realistic, school settings. Specifically, the case exercises elicit students' declarative, procedural,

and contextual knowledge as well as foster students' awareness of the schema they bring to decision making, and their reflection upon it. The cognitive scaffolding of the decision-making process is embedded in the architecture of the software and reflects a synthesis of multiple decision-making and problem-solving models. As the final step in the process, students are prompted to formulate their plan of action, using the framework for effective leadership proposed by Leithwood, Louis, Anderson, and Wahlstrom (2004).

ETIPS cases use a four-step decision making model that emphasizes the procedural knowledge of (1) identifying a leadership issue, (2) identifying principles to guide the decision making, (3) considering alternatives with associated opportunities and constraints, and (4) selecting the best alternative solution for the context and creating a plan of action that includes setting direction, developing people, and making the organization work. The development of student ability to complete these steps is scaffolded as they work through the ETIPS cases by means of the decision-making framework which is embedded in the user interface. The substance of the case answers provided by students draws upon their declarative knowledge (e.g., facts, ideas, theories) and serves as practice opportunities to develop their procedural knowledge about the decision making process. Figure 1 provides a more detailed description of each step and the guidance that is provided within the ETIPS environment.

The ETIPS cases were also designed to develop the contextual understanding of knowing when and how to apply declarative and procedural knowledge. The ETIPS platform adds value to case methods of instruction through its multiple school contexts in which cases can be set, thereby allowing pre-service administration students an opportunity to develop an understanding of how the different school contexts might influence the application of theory in practice. By taking school context into account when making decisions, the learners can gain a sense of the complexity of a school environment and the multitude of factors that they may encounter in a clinical setting, an essential skill needed by pre-service administrators to make the transition from classroom teachers to their future roles as school principals.

Finally, the ETIPS cases were designed to stimulate personal reflection through their reliance on real data or realistic events in all their complexity; learners see there are several possible alternative solutions but they must select and develop just one solution and explain their decision. Students interacting with the same case will often produce very different decisions and justifications, which allow faculty members, through discussion and feedback, to draw out individual learners' assumptions and interpretations for further examination. These interactions with peers can further facilitate student reflection and understanding of their own assumptions and processes related to the topic under study. In effect, the cases serve as a window into the experiences and ideas of the educators because their responses mirror their varied beliefs, attitudes, and experiences. By sharing different interpretations of the same set of facts and understandings of a particular school context, students are able to appreciate different perspectives of the same reality. This flexibility of thought and perception is an important skill for school leaders who interact with a variety of constituencies on a daily basis. ETIPS cases have been proven to be effective in helping learners to recognize more detail and complexity in the organization and culture of schools as they prepare to take on new roles within them (Dexter, Riedel, & Scharber, 2008).

Figure 1. Decision Making Model for ETIPS Leadership Cases

Step 1: Identify the issue that needs to be addressed
• Consider many possible explanations of what is happening (including inherent assumptions within each) • Deduce the fundamental underlying nature of problem • Seek the appropriate amount and nature of data in order to make the decision • Identify the desired goals that define the scope and scale of necessary decision • Deduce additional data needed • Identify the team of people who should become involved
Step 2: Identify the guiding principles (Declarative + Dispositions) you will apply to the decision making
• Identify appropriate guiding professional (declarative) knowledge • Identify appropriate guidance to be derived from school goals and mission • Identify dispositions that influence thinking
Step3: Identify alternatives with associated opportunities and constraints (i.e., context) and analyze their merits using the guiding principles
• Consider alternatives that address problem/issue • Allow for new and creative ideas • Identify opportunities and constraints for each alternative • Analyze alternatives using guiding principles and stakeholders' perspectives
Step 4: Select “best” alternative (for context) and state next steps of action
• Select alternative most consistent with guiding principles • Create a plan of action
Step 5: Evaluate effectiveness and determine principles or criteria to add, drop, or reprioritize

Data Sources and Methods

During the 2008-2009 academic year, nine faculty were recruited from eight institutions of higher education in the state of Virginia that offer administrative licensure and master degree programs in educational administration. All of the participating universities are publicly funded except for two. These programs vary across a number of dimensions including location (i.e., urban, suburban, and rural), size and nature, achievement levels of the students in districts in which most of their administrator candidates will work, and utilization of technology. These variations maximized our opportunity to learn about implementation with different stakeholders and types of programs.

Faculty from these universities agreed to implement two ETIPS cases as an integral component of an educational administration course such as organizational leadership, school and community relations, or instructional supervision. Training was provided to the faculty members, and guidance was given on the ideal implementation of the cases. All students taught by these instructors completed the cases for course credit and were invited to participate in the study. Data were collected on students who granted permission (n = 68), and the results are based on the survey and case responses of the convenience sample of participating students.

A pretest-posttest design was used to gather data on the implementation of the online case software. Students who volunteered to participate in the study completed a pre-intervention survey and one case prior to the implementation of the two treatment cases which were integral to their course. Once the third case was submitted, students completed the post-intervention survey. Case responses were scored using a refined rubric based on the decision making model embedded in the design of the cases. The decision making process in the ETIPS cases is organized into four steps with multiple prompts to which students make selections from lists about their thinking during the case experience and provide narrative responses to open-ended questions. The first and third case responses were collected from 68 students in the participating administration programs and scored using a 0-3 point rubric that examined the 15 distinct answer parts of the four-step decision making model embedded in the design of the cases. For each step, students responded to prompts such as, "*How will you articulate the direction you have set in order to create shared meanings and your performance expectations for moving in this direction? What data will you collect / monitor in order to help your leadership team track the school's progress and performance for this direction?,*" which required the demonstration of specific skills in formulating a plan of action to implement a decision. In addition, for each step, students rated their confidence in and certainty of their answers. The confidence and certainty scores were combined across the four steps to generate two scales, one for confidence and one for certainty; the scales were found to be reliable (Cronbach's alpha of .88 and .96, respectively).

The decision making process in each case is organized into four steps with multiple prompts. For each step, students provide narrative responses to open-ended questions about their thinking during the case experience. The research team scored each of the narrative responses using a 0-3 scale with unique indicators for scores of 0, 1, 2, and 3 based on the literature that explores the qualities of novices and experts in their cognitive processing of information (King & Kitchener, 1994; Leithwood & Steinbach, 1995; National Research Council, 2000). A rating of 0 indicated a vague and unrelated response to the case, and a rating of 3 indicated a sophisticated and logically consistent response to the case. Ratings reflected assessments of both quality and quantity, that is, the number of ideas (fluency) and coverage of key components (complexity) for each facet of elicited responses. Fluency was assessed based on the student's ability to generate multiple ideas in response to the open-ended questions with an increasing number of ideas expected in the student's responses in order to earn higher ratings on the rubric. For example, responses with one or two suggested strategies for "setting direction" as part of the plan of action garnered one point on the rating scale, whereas four or more strategies were expected for a rating of 3 points. Complexity was judged based on an identification of strategies that addressed a full range of subcomponents in the task. For example, for a score of 3 points on a response about "setting direction," the answer was expected to include "a rich mix (4 or more) of strategies," which addressed: (a) developing a shared vision and goals for the school, (b) communicating them to constituents, and (c) monitoring organizational performance. Selected items from the scoring rubric for step 4 of the decision-making model are shown in Figure 2. Cases were scored by multiple authors until the inter-rater reliability reached .77;

remaining cases were then scored by one of the three researchers. Decision making scores were generated for each of the four steps. The first case completed by a student served as a pre-test and the third case served as a post-test.

Figure 2. Scoring Rubric for Step 4: Selecting the "Best" Alternative and Creating a Plan of Action

Step 4: Setting Direction Question Prompt: How will you articulate the direction you have set in order to create shared meanings and your performance expectations for moving in this direction? What data will you collect / monitor in order to help your leadership team track the school's progress and performance for this direction?			
0 Points	1 Point	2 Points	3 Points
Student does **not** discuss strategies for developing clear goals for the school, communicating them **or** monitoring organizational performance.	Student discusses **one or two** strategies for developing clear goals for the school, communicating them **or** monitoring organizational performance.	Student discusses **multiple** (3) strategies for developing a shared vision and goals for the school, communicating them **and** monitoring organizational performance.	Student discusses a **rich mix** (4 or more) of strategies for developing a shared vision and goals for the school, communicating them **and** monitoring organizational performance.
Step 4: Developing the People Question Prompt: How will you develop people's capacity to move in this direction? What support and opportunities to learn are needed?			
0 Points	1 Point	2 Points	3 Points
Student does **not** discuss strategies for supporting faculty reflection, learning and growth to foster improvement at the school level.	Student discusses **one or two** strategies for supporting faculty reflection, learning and growth to foster improvement at the school level.	Student discusses **multiple** (3) strategies for supporting faculty reflection, learning and growth to foster improvement at the school level.	Student discusses a **rich mix** (4 or more) of strategies for supporting faculty reflection, learning and growth to foster improvement at the school level.
Step 4: Developing the Organization Question Prompt: What will make the organization work to help you achieve movement in this direction? What are the entire range of conditions and incentives necessary in the school in order to fully support rather than inhibit stakeholders moving in the direction you've set?			
0 Points	1 Point	2 Points	3 Points
Student does **not** discuss strategies for strengthening the school culture, modifying organizational structures, building collaborative processes, **or** managing the school environment.	Student discusses **one or two** strategies for strengthening the school culture, modifying organizational structures, building collaborative processes, **or** managing the school environment.	Student discusses **multiple** (3) strategies for strengthening the school culture, modifying organizational structures, building collaborative processes, **and** managing the school environment.	Student discusses a **rich mix** (4 or more) of strategies for strengthening the school culture, modifying organizational structures, building collaborative processes, **and** managing the school environment.

A pre-intervention survey for students included items on academic status and coursework, experience using cases, familiarity with technology, gender, and readiness to be an administrator. The post-intervention survey included items on the case experience. Both the pre-intervention and post-intervention surveys included 12 items regarding decision-making self-efficacy. The reliability of the self-efficacy scale was high (Cronbach's alpha of .96). Case scores and survey responses were entered into and analyzed with SPSS using a 2 (four decision steps) X 2 (case 1, case3) repeated measures design to analyze the variance across cases of each of the decision making steps and total scores, as well as the interaction effect of steps across cases.

Findings

Overall, the treatment intervention had several significant positive affective and cognitive outcomes for students. The correlations among the four steps of the decision making model were low and non-significant, suggesting four distinct cognitive processes are indeed represented in the decision-making model which is embedded in these cases.

First, the step by case interaction indicated that from case one to case three there was a significant difference in the students' step scores, which represent their skill at carrying out each of four decision-making steps, $F(3, 201) = 5.56$, $p = .001$. Students made significant gains for the first two steps of the decision making process (see Table 1). Step 1, identifying the issue, improved 1.5 points on the 15-point scale (p= .005) and step 2, consider guiding principles, improved .6 points on the 9-point scale (p = .028). Second, the mean composite score for case three was higher than case one. This main effect for the cases, $F(1,67) = 4.29$, $p = .042$, indicates that the ETIPS cases are effective instructional materials for improving educational leadership students' decision making skills. All of the assumptions of the model used to test within-subjects effects were met.

Table 1
Descriptive Statistics for Students' Step-by-Step Case Performance

Step	Points in Scale	Case	M	SD
1: Identify the Issue	15	1	2.85	2.96
		3	4.28*	3.13
2: Consider Guiding Principles	9	1	1.76	1.60
		3	2.34*	1.57
3: Formulate Alternatives	12	1	4.72	3.10
		3	4.40	2.52
4: Develop Plan of Action	9	1	3.85	1.80
		3	3.91	1.59
Mean, Steps 1-4	-	1	3.30	
		3	3.73*	

* $p < .05$

Affective outcomes measured for students included their decision-making self-efficacy, certainty about case responses, and confidence in their current ability to carry out the decision-making steps required in the case as reported in Table 2. The self-efficacy of students increased significantly between the pre-intervention assessment and the post-intervention assessment (p = .03). Both confidence and certainty in responses increased significantly from the first case to the third case (p = .00).

Table 2
Descriptive Statistics for Students' Affective Outcomes

Measure	Points in Scale	Time	M	SD
Decision-Making Self-efficacy	72	Pre	36.1	11.5
		Post	38.8*	10.9
Certainty About Case Responses	16	Case 1	11.1	2.8
		Case 3	13.1*	2.1
Confidence About Decision-Making Abilities Required in Case	24	Case 1	13.3	4.4
		Case 3	16.5*	4.4

* $p < .05$

The average scores for self-efficacy, certainty and confidence are well below the maximum points on each scale indicating that there was no ceiling effect and that there was ample room for future growth if students were to use additional cases. There were no significant differences among demographic groups (academic status and coursework, experience using cases, familiarity with technology, gender, and readiness to be an administrator) for any of the outcomes. Also collected, but reported in detail elsewhere, were results on the impact of instructors' case methods of instruction upon these students' outcomes (Dexter, Tucker, & Stuit, 2009).

Significance

Despite differences across institutions and instructors, the results of this study provide clear evidence of improved student performance on the decision making tasks in these cases. Particularly noteworthy is the modest nature of the intervention; significant results were obtained after completion of only three cases. Case one was completed as a pre-test and cases two and three were integrated into the formal instruction of each course. Performance on case three served as the post-test. Further research is needed to explore the effects of a more sustained intervention, for example, across multiple courses, on actual decision making performance as well as self-efficacy, confidence and certainty.

These results suggest that not only can decision making skill be taught, as argued by numerous researchers (Copland, 2003; Davis & Davis, 2003; Hallinger, Leithwood, & Murphy, 1993; Liethwood & Steinbach, 1995), but student learning can be measured. These findings on case use in administrative courses offer educational administration programs a viable pedagogical tool to develop the distinct cognitive processes of decision making and a diagnostic tool for measuring a core competency of future school leaders. Furthermore, this analysis suggests that other complex leadership skills can be reliably measured using detailed rubrics that are tightly aligned with specific tasks. These are promising findings for preparation programs that are searching for ways to capture learning outcomes for their students and provide evidence of program efficacy.

Finally, this study suggests the effectiveness of a highly structured approach to the implementation of cases, such as the one used in this software. These cases and their implementation were sophisticated and purposeful; these limited data on the learning effects from cases, while groundbreaking, constitute only the first step of many to warrant the recommendation that cases be adopted as a signature pedagogy in educational administration. Further research is needed to extend the empirical evidence on the contribution of cases to the preparation of pre-service administrators. More specifically future studies are needed to determine (1) whether there is comparable skill development across all steps in the decision making process for individual students, (2) the cumulative effects of case use across multiple courses within a

preparation program, (3) viability of using case-based measures of decision-making skill as a component of program evaluation, (4) the predictive validity of these cases for leaders' performance in a variety of school settings, and (5) utility of ETIPS cases for the professional development of in-service school leaders.

Conclusions

The field of educational administration and leadership faces a similar challenge as do other professional fields concerning the preparation of candidates who are able to both acquire the specialized knowledge presented in coursework and then apply it to real life problems in the workplace. The available research (Broad Foundation & Thomas B. Fordham Institute, 2003; Grogan & Andrews, 2003; Kowalski, 2004; Leithwood, Jantzi, Coffin, & Wilson 1996; Murphy, 2006; UCEA, 1987; Young, Petersen, & Short, 2002) suggests that administrators in training would benefit from additional and better opportunities to organize and make sense of the declarative knowledge developed through preparation programs by structured application of the knowledge in decision making. If programs are to develop "expert" decision makers who are able to formulate detailed steps to solve problems as characterized by the research of Leithwood and Steinbach (1995), then students must acquire a deeper and richer knowledge of strategies for leading schools. Moreover, in order for pre-service administrators to develop sophisticated decision-making skills which are grounded in theory, they need multiple opportunities to discuss the development of plans of actions. Leadership preparation programs can facilitate this learning and help students progress along the continuum from novice to expert decision-makers who are able to reflect an understanding of the facts and evidence presented in a case and then formulate a strategic and holistic response that specifically addresses the issues at hand.

ETIPS cases offer a novel approach to teaching the core decision making role of school leaders because of their digital architecture and the more open-ended nature of the cases themselves. They "unpack" the cognitive process in a way that allows for more explicit feedback and discussion on an individual or group basis. The ETIPS cases are more ill-defined in nature than traditional cases which allows for greater learner-determined framing of the issues and prospective development of action plans to address identified leadership challenges. Most importantly, analysis of data from the first year of implementation indicates significant positive affective and cognitive outcomes. ETIPS cases were found to be effective instructional materials for improving the quality, sophistication and coherence of educational leadership students' decision-making skills. In addition, positive increases were found in affective outcomes which included decision-making self-efficacy, certainty about case responses, and confidence in the ability to carry out the decision-making steps required in the case.

The ETIPS online leadership cases are an instructional tool that can be used as an integral component of coursework to develop procedural knowledge, such as decision making, and to foster situational cognition and real-life problem-solving skills. The cases develop and scaffold the cognitive processes needed in future leaders to diagnose and interpret problems and to make decisions about leading a school in concert with others. As noted by Taylor, Cordeiro, and Chrispeels (2009), cases serve an important role in the continuum of strategies that bridge classroom learning with the workplace. Ideally preparation program will begin to implement a blended curriculum and set of pedagogies that develop a comprehensive declarative, procedural and contextual knowledge base for school leadership. Cases serve an important role in the development of a future leader's knowledge base through their use in the classroom and by supplementing and extending field-based experiences, which are considered critical in developing a context-sensitive understanding of leadership within schools (SREB, 2006). This research contributes to our understanding

of a more fully elaborated set of instructional strategies that nurture the development of the knowledge and skills needed by aspiring school leaders to fully participate in and lead communities of practice.

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